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Mosaic Pavements and their Teaching.

F all the relics of the Roman occupation in Britain which in any way claim the attention of the artist of modern days, none surpass the pictorial and ornamental tesselations of mosaic pavements,* which are found to have embellished so many villas and edifices that still mark the spot where the foreign conqueror centralised his civilising influence over the neighbouring rude and inartistic population. To a people like the ancient and uncultured Britons in the first and second centuries of our era, whose undoubted relics indicate utility and ruggedness, innocent of any real attempt to combine human need with the divineness of artistic beauty, a people whose coarse earthen urns and simple weapons sufficiently indicate the primitive character of their life, Roman fine arts must have been little short of a revelation. The few remains of domestic dwellings that can safely be attributed to the inhabitants of Britain when the Romans first made their appearance on the southern shore seem to be mere conglomerations of huts with imperfectly circular plan, fortuitous doorway, and little indication of permanent floor or roof, but the Roman idea of architecture was in the main of an entirely different order, distinguished (as befitted that great race of stalwart soldiers who owed their world-wide power to military foresight and strategics), by solid and enduring stonework, quadrangular in plan, and endowed with more or less symmetry of design. Thus it is, that although no two Roman villas or other buildings in England indicate any great closeness of conventional form in their entire *ensemble*, yet there are abundant perfectly intelligible details of proportion, fashion, material, and appearance, which enable the practised antiquary and the architect without difficulty to attribute to its proper origin any fragment of a building, however small it may be.

One of the most important details of the Roman edifice, whether public or domestic, sacred or profane, which had any pretension to strength or influence, was the pavement, upon which, as upon the stucco which covered the walls and the stonework which adorned the façades, the Roman art-designer quickly seized as a vehicle for the exhibition of his ornamental handiwork. Our province on this occasion is confined to the pavement, which Mr. Thos. Morgan has illustrated in his work in a manner well becoming the subject of which it treats, but an equally beautiful and attractive companion volume might be written about the decorative patterns on the walls and the subjects sculptured on Roman stonework extant in the form of temples, altars, sarcophagi, and other enduring examples of that people's stonecraft. It is, perhaps, remarkable that in these late days, when the extensive labours of so many archæological societies have recorded in their respective journals and transactions such a vast collection of miscellaneous records of Roman remains discovered in England, no one, until Mr. Morgan wrote his work, had attempted to place a summary of the Romano-British mosaic art before the world. Lysons, in his well-known "Reliquiæ," published at the beginning of this century, endeavoured to do so, but the magnitude and expense of the work naturally deprived it of that popular and comprehensive character which belongs to the work before us. Wm. Fowler in 1796–1818; J. R. Smith in 1850; and the learned C. Roach Smith, at a later date, have also given some attention to Romano-British mosaics.

These British relics date, it is stated, principally from a period not much earlier than the Gordians, or about A.D. 244, and for the most part follow the direction of the Roman roads which have been recorded in the "Itinerary of Antoninus," of which the author gives a copy, illustrating it with a capital account of the progress of civilisation along the course of the main roads leading from the south to such distant parts of the island as Cockermouth in Cumberland, Carnarvon, Chester, and Carmarthen. He discusses also the two classes of subjects which in Romano-British mosaics are generally found in combination, viz.: the Myth of Orpheus, or the resistless power of music personified, for music was the constant accompaniment of the Roman feast,—and by no means exclusively Roman;—and the Myth of Bacchus, who in turn may be considered as the personification of refined luxury. These myths, combined with varieties of symbolism and astronomical or season emblems, set in frames, as it were, of elaborate patterns to which the little tessellæ or rough-hewn stone cubes of various hues easily and happily lend themselves, suffice to illustrate, as they themselves are in like manner illustrated by, numerous passages in the writings of the classical and post-classical authors. The banquet of the rich and luxurious Roman could not have been, as some would have it, little better than a barbarous and hasty meal, for in rooms devoted to the feast, such as those still extant in area at least at Bignor, Brading, Woodchester, and Cirencester, the one surviving witness to the refinement of domestic life attests by implication how ceremonious must have been the concomitant methods of daily life in the hall of the Roman governor and landed proprietor in Britain.

In many cases these remarkable pavements have been ruthlessly destroyed or seriously injured; even now there exists no accepted means of securing fine examples of them from the destructive agency of careless but absolute ownership. The greedy march of civilisation, the ploughman, and the gravedigger efface some, as at Woodchester and London; in others, an ineffectual attempt to shelter them from weather only retards the evil day of destruction; some have been covered over again with earth, which, perhaps, is a safe means of obliterating, and, so far, preserving them, but this is unsatisfactory, and an admission of our inability to conserve them in a more useful manner; and others, finally, have been removed, more or less successfully, to museums and private collections, but want of floor space in our national Museum compels the authorities to affix them to walls and set them upright, which is as incongruous a treatment as if urns or altars were to be laid on their sides. The catalogue of them is, however, a goodly one, and extends to more than 180 examples, arranged by Mr. Morgan according to counties. This list, moreover, does not pretend to completeness, but may be taken to comprise all those worthy of record for comparison by future inquirers who may desire to follow up a study shown in this book to be so attractive and so instructive. If these pavements were so common in the time of Seneca,—one of the richest periods of Roman history, when the meridian of its vitality had just passed, and the decadence which inevitably follows the heaping up of wealth had set in,—that he was accounted but a poor man who could not afford a tesselated pavement in his best room, there must, indeed, be many more such relics scattered throughout the length and breadth of the land awaiting the future discoverer, at a time when we hope a more intelligent generation even than the present will not be slow to recognise the paramount necessity of extending a Parliamentary protection to them by way of recognising the value of these ancient evidences of an art now lost; for modern mosaics, of which Mr. Morgan shows a coloured picture of one of the finest, are, except in rare instances, at best but travesties. Wellow, in Somersetshire; Woodchester, Chedworth, and Cirencester, in Gloucestershire; Horkstow and Barton-on-the-Humber, in Lincolnshire; Caerwent, in Mon-

* Romano-British Mosaic Pavements: a History of their Discovery and a Record and Interpretation of their Designs, with plates, plain and coloured, of the most important mosaics. By Thos. Morgan, F.S.A. London: Whiting & Co. 1886.

mouthshire; Littlecote Park, Wilts; Stansfield and North Leigh, Oxon; Aldborough, Yorkshire; Wingham, Kent; many sites in London; Bignor, Sussex; Frampton, Dorset; Itchen Abbas, Hants; and Morton, near Brading, in the Isle of Wight, are the fortunate sites of some among the many which appear to indicate more than usually interesting characteristics. In conclusion, Mr. Morgan devotes considerable space to the consideration of the British and foreign pavements exhibited in the British Museum; but as we have already given a full account of these in the *Builder* for 1882 (vol. xlii., p. 757), it is not necessary to do more than refer the reader to that notice. This is followed by an illustrated chapter on Roman coins, having reference to British history during the period covered by the age of the pavements, A.D. 46–388; and notes on the Itinerary of Antoninus.

Reviewing the themes delineated in these stone pictures, it will be noticed that the subjects most frequently repeated are:—Orpheus with his lyre, taming the wild animals, which pass along in slow and measured step in a circle around him. There are nine of these examples altogether. Bacchus, with his companion panther, occurs six times; and without that accessory emblem, once, at Frampton. The *cantharus* or wine-jar of this deity, fit emblem of the *symposium*, is seen at no fewer than eleven villas. Harmonia, the mystic wife of Cadmus, or the Music of the Spheres, once, at Morton; the Seasons, or four quarters of the year, occurs at least four times; and at Morton are seen three of the four parts which held to the constitution of the day, viz., *gallicinium* or cockcrow, *conticinium*, the midway period, and *diluculum*, or twilight. Neptune and cognate marine themes appear in eight examples. Other subjects of single or infrequent occurrence are,—Lycurgus, the enemy of Bacchus, with his axe; the bleeding head of Pentheus upheld by his mother Agave; Juno, the Junonian peacock, and Iris her messenger; Mercury; King Morrheus and the nymph Chalcomedia; Actæon; possibly Isis, with her peculiar musical rattle or *sistrum*: Cupid; Æsculapius; Hercules; and Antæus. Hunting scenes are not uncommon, and the popular national games of the chariot and the gladiatorial arena are met with, as well as numerous designs of less importance.

We have said enough to show the great scope of the subject which this book elucidates, and it may be closed with the reflection that Mr. Morgan deserves credit for his successful endeavour to lay before his readers a succinct and general view of the art and history of the mosaics of the Romano-British era. A whole volume might be written on the subordinate ornamentation only; for in many pavements, or rather in the majority of them, the aims of the designer and workman, and the wishes of owner, have been evidently satisfied with elegantly-conceived scrolls, cables, plaits, wavy branches of foliage, and geometrical patterns of interlacing ribbons, of which the harmony of the colouring evinces the highest taste, and a profound acquaintance with the rules of prismatic contrast and secondary tints. But if we attempted to dilate on these points, we should have to go over ground which we have already treated in the article to which we have made reference.

There is a practical view, however, which must not be forgotten. In the present revival of the useful and effective art of constructing mosaic pavements, much has yet to be learned, and it can only be learned by a close and intelligent examination of the details of formation: the *technique*, in fact, practised by the old Roman architects, and those who worked under them. There is no reason why the skilful English workman should not produce specimens of mosaic floorwork as good in every respect as their prototypes; but for colour, subject, and a peculiar canon of perspective and drawing, he must train eye and hand more cunningly than hitherto. There is a stiffness and precision about modern work which has taken the place of the unevenness of outline which gives so great a charm to the old specimens. Even the colour and composition of the mortar which holds the blocks of stone together is an important factor in the picture; the great comparative range of their dimensions is another peculiarity to which sufficient attention has not been given; and the ingenious application of opaque, transparent, and lustrous materials, must not be forgotten. The direction and angle of the light which is to fall on the mosaic should be a matter of careful study, as error in this respect is certain to mar the effect; for the same pavement seen by a low side-light, and viewed from a high-walled room with open sky-light, would present a very different effect to the beholder.

One other remark we are constrained to make before we conclude. It is this, that the lessons which may be learned from the mosaics must become eventually impossible, unless the protection which has been tardily afforded to the far more durable and far less artistic relics of the Stone age, the monoliths and megaliths of the south-west and north-west of England, be quickly extended to the fragile mosaic remains of the south and other districts, while there is yet time to secure them by comparatively inexpensive means from further injury. Many of the known examples are crumbling away for want of judiciously arresting the loss of adhesive power in the mortar which has been exposed to damp; others are jeopardised in other ways, and unless some system is established for their reparation and care, we shall before a very long time be able to study these antiquities only by means of such works as that which Mr. Morgan has prepared.

VENTILATION OF SEWERS.

In all sewers the form and inclination are designed to conduce to the one object of getting rid of the sewage from the houses and streets as quickly as possible to an outfall where its complex nature can be simplified by separating everything it contains from the water which constitutes its chief bulk, so that this may be discharged into a river without injury, the water being first in some measure purified, either in tanks or through the soil of agricultural land, according to the situation and other circumstances. The engineer can give any form to the sewer, but not always the inclination which would be the best; in this respect he is bound by the consideration of expense, and can in some cases give no more inclination to a main sewer than that which is sufficient to create the minimum velocity which experience has shown to be necessary for the proper flow of the sewage. For these reasons sewage lingers in sewers longer than it would do if greater expense were incurred, and the longer the time which elapses between its reception into the sewers and its delivery at the outfall the longer it is in contact with a part of the atmospheric air in which we live. Taking the year round, the average temperature of the air in sewers is higher than that of the outside. This comes about from various causes, one of which is the comparatively high temperature of the liquid delivered into the sewers from the house drains, and from manufacturing premises. The air, then, in sewers, in contact with sewage, tends to rise into the atmosphere, loaded with vapours and those gases from the sewage which are lighter than atmospheric air.

What, as a practical thing, can we do with them? At present we can do no more than conduct them by channels of easy passage into the air above the house-tops, into the wind, to be blown about and dispersed so as to be practically harmless. But stress must be laid on the insufficiency of present knowledge on this subject, and when we see inventions from time to time put forward to cure the evil of sewer gases, we are inclined to look leniently upon the attempt if it appears at all reasonable and likely to succeed in effecting the object intended. It is, however, necessary to call the attention of inventors to the facts of the case, with which some of those who have turned their attention to this subject seem to be unacquainted. Any considerable length of sewer necessarily has numerous openings for the inlet of sewage. A system of sewerage is either on the separate or the combined system. The combined system is that which admits to it all the rainfall as well as the sewage of the houses and other premises; the separate system is that which separates from the sewage as much of the rainfall as is practicable, so as to reduce the work of dealing with the sewage at the outfall, the rainwater going into the rivers as it always has done. There is a distinction to be made between a large and closely-built town and one in which there are numerous and large open spaces. In what we might call a thick population the dirt on the streets washed into the sewers is nothing but sewage, and must be dealt with along with the house sewage, and accordingly the street gullies communicate with the sewers. In the other case the greater part of the rainwater is separated and turned into its natural channels, but in either case the house-drains have to be considered, each one of which has several openings. It may be said that these openings should be trapped, to prevent the passage of air. They are so, but to what extent? They can only be trapped,—that is, when water is used as the bar to the passage of air,—by forming a dip in the drain bottom, and if the top of the drain at the trap be brought down more than about 2 in. below the bottom of the adjoining part of the drain, the obstruction to the passage of the sewage along the drain is too great, and stoppage occurs by the dipped part of the drain becoming filled with sediment; and for this reason the dip is made as little as possible. There are various forms of traps, and some allow of a greater bar to the passage of air than others do, but taking them all round, the average would not exceed 2 in.; and if the average did exceed 2 in. there would still be a number with no greater bar than that, and so it can be calculated to what extent the air on the sewer side of the trap can be rarified without withdrawing the water from the trap and letting air pass, when it is proposed,—as, occasionally, it is,—to withdraw the air of sewers at one or a few points, and purify it before it is discharged into the atmosphere. The openings in the middle of the street so often complained of are, of course, untrapped; they were, in fact, made there for the purpose of letting out the foul air of the sewers in preference to letting it escape through the gully-holes alongside the footways, being the lesser of two evils; but when the air of sewers is withdrawn or carried off in any manner these openings in the street become inlets through which fresh air enters the sewer. Now go to the trapped openings and take the bar to the passage of air to be that of the weight of 2 in. depth of water. The weight of the atmosphere on one side of a trap would support 400 in. in height of water on the other side, if the air were wholly withdrawn from it; but it is, of course, proposed to withdraw only a part of the air, whereby the pressure would be reduced in some degree. Let this degree be the one four-hundredth part of its full pressure, or, measuring it by the mercury barometer, let the pressure be reduced from 29·40 to 29·32, then 1 in. depth of water in the trap would be pressed out, leaving still 1 in. as a bar to the passage of air; but if the pressure on the sewer side of the trap were reduced by two four-hundredth parts, or the one two-hundredth part of the full pressure, that is, if the barometer were reduced from 29·40 in. to 29·25 in., then the trap would become unsealed, the water would be expelled, and it would no longer form a trap; and this would be so though the greater action were not continuous, but instantaneous only, for as soon as the air is forcibly withdrawn from the sewer side of the trap, to the extent of even 1 in., the water in the trap drops on the other side to that extent, and because the air is elastic the lowering is not gradual and regular in accordance with the power exercised in withdrawing it, but there ensues a sort of palpitation or oscillation of the water in the trap, which sooner or later clears a passage for the air and establishes a direct communication between the atmosphere and the air-extractor connected with the sewer.

This is why the foul air of a system of sewers cannot be extracted and purified at any one point, or at a few points, because wherever along a line of sewer a site were to be chosen for the purpose of withdrawing and purifying the sewer air or gases, it would be surrounded by these openings, and how then could it be expected that the air with which an extractor would be fed would travel any great distance along the sewer? It would, in fact, draw air through these openings, untrapping those which ought to remain trapped, in preference to fetching the air of the sewer from any great distance; for, in this case, the extractor would find a drag upon its action, caused by the friction of the air in its passage along the sewer, and the drag would be relieved by the supply of air from these sources.

It should be considered that any special apparatus would be expected to deal with more than one sewer, and that a district would be appointed to it, small or large according to its capabilities and efficiency, and that the district would consist of a system of main and branch sewers all connected with one another. Now branch sewers are not exactly proportioned in size to the quantity of sewage they carry off; proportionally to that they are usually larger than the main sewer, and to create a draught of even one mile an hour in the far-off branches, the velocity in the main must be very much greater. The force required to draw the air along the sewer is proportional to the square of its velocity, so that any great increase of velocity of the air approaching the extracting apparatus, which is necessary in order to fetch the air from the farther branches, must entail a greatly increased force, over what would be required for the extraction of the air of one sewer only.

Many people, with the most praiseworthy intention, have proposed means of dealing with this foul air or sewer gas, as, for instance, to make a connexion between the sewer and the gas-lamps of the street and burn it, but the foul air or sewer gas is introduced, not into, but outside of the flame,—not into the gas-pipe, which would not be allowed by the gas company or other proprietors of the gas works,—but merely to the flame, from which the greater part escapes without being touched by it.

Another and more practical proposal is to connect all factory or other high chimneys with the sewers, either directly or through the furnaces of the steam boilers, and although this is a very proper outlet for the foul air of the sewers, yet the advantages which these afford to the ventilation of the sewers are in general so few that that system cannot be reckoned upon as of much use, except in manufacturing towns. A little of a good thing is better than none, and for that reason every high chimney and every furnace ought to be connected directly with the sewer near it, but even when that is done, something else is required to get rid of the foul air of sewers and house-drains. At present, the only other practicable means known to exist consist in affording an easy outlet at numerous points in the length of every sewer, and carrying up these outlets high enough to let the foul air escape in the open air above the house-tops, rather than at the ground level; but wherever this plan is adopted, it is highly necessary that the openings be very numerous, so as to divide and not concentrate the evil. Wherever there is an offensive escape of sewer gas, it may almost certainly be said that there are too few openings between the sewer and the atmosphere. It has frequently occurred that when there has been a bad smell about a house, because the house-drain was not ventilated, it has been attributed to the nearest opening in the middle of the street, and by persistent complaint the opening has been ordered to be closed, with a few more which have been complained of, but in all cases with the inevitable result of increasing the bad smell at other openings. Now if in all these cases attention had been in the first instance given to provide proper outlets for the sewer gases, instead of attempting to ignore them by shutting them up, none of these street openings would have been offensive. The only result of closing the openings in the streets is to drive the foul air to find its own outlet in or about the houses, where proper outlets are not provided in the house drains, and, where they are, no smell arises from the street openings. This appears to be the only practicable way at present of ventilating sewers and house-drains. That a better way may be found we do not deny, and hope to see it soon effected, for of all sanitary improvements in towns it is the greatest which could be made. In any attempt in this direction it should be observed that while the air of sewers has always a tendency to go up the incline to the higher points, there are numerous instances in which it is drawn in the opposite direction, sometimes because of the very slight inclination which the sewer has, sometimes because of the direction of the prevailing wind, and sometimes because the current of water in the sewer is strong enough to carry with it the stratum of air with which it is in contact, so that persons are sometimes surprised to find the air escaping from the sewer through the openings at the bottom of the street rather than at the top. But these are exceptional cases, and can be dealt with according to their peculiarities. The rule holds good that if a sufficient number of openings of easy ascent be provided along a sewer the gases and vapours arising from the sewer will follow these channels and escape into the air at the places appointed to them, which should be, of course, above the house-tops and away from windows; and if they are sufficiently numerous, that is to say if there is at least one to every house-drain, there will probably be no escape of foul air from any of them; but it has been proved that there is an offensive escape of air from them when they are few in number, compared with the length of the sewers. Besides the number, they need to be of considerable size; if they were 6 in. in diameter they would be all the better, but they should not be less than 5 in., and should project above the roof 6 ft., being made in 9-ft. lengths, so that the uppermost joint may be effectively secured. The usual fault is to make these air-pipes too small, a very poor economy in comparison with the benefit they confer on the drainage system.

THE BRITISH SCHOOL AT ATHENS.

THE meeting in support of the British Archæological School at Athens, which was held in Albemarle-street on Tuesday, is one of the indications of the remarkable revival, in these latter days, of interest in the buried remains of antiquity. The antiquaries of the Renaissance drew their inspiration from Rome, where the remains of past architectural grandeur were visible before the eyes and palpable to the touch, without any of the expense and labour of speculative excavation. The *venue* is changed to Greece now, and no man can make himself more secure of honour and reputation among the educated minority than by digging up a temple, or a statue, or a collection of coins. It is the credential of antiquarian respectability to have found something in Greece. Were Hamlet alive now, he would modify one of his well-known phases, and say "By 'r lady, he must dig up temples, then, or else shall he suffer not thinking on, like the hobby-horse." Of course, we are sadly behind hand, as a nation; though individuals like Mr. Newton and Mr. Wood have done nobly for our honour and the information of posterity, and would have done more nobly still had not an unimaginative and economical Government left them all but unaided in their work. But Germany, France, and America have already their schools established at Athens; the two former for some time back, the latter, though we believe more recent, an exceedingly active and well-informed institution, disposed to anticipate its rivals wherever possible. For rivals the schools at Athens, now increased to four in number, will, we presume, be in fact, if not in deliberate intention; and it is curious to consider that there are now four foreign establishments in Athens with the special object of looking for artistic relics of ancient Greece. It would be natural to think that, with all these forces in the field, the antiquities held in suspense in the soil must be ere long precipitated, so to speak, and that the work of the schools must cease at no very distant date through want of more worlds to conquer. Yet this stage may not, with all diligence, be reached so soon as one is inclined to expect. So many remarkable finds have been made in recent days, in places where remains had been for ages unsuspected and unthought of, that it is impossible to judge what extent and variety of remnants the Attic landscape may yet cover, to be unearthed by degrees, as new contributions to the book of ancient history. One thing, at least, is certain, that as long as new discoveries in Greek architecture and art remain to be made, so long will it be worth while to uphold and support societies to engage in the work of discovery. So remarkable, so unexampled hitherto in the world's history, as far as we know it, were the æsthetic perception and plastic power of the Greek genius, of such extraordinary interest are its remains, that we can hardly rest content until we have recovered from their tombs of ages every remnant yet left of the work of "the supreme Caucasian mind."

The proceedings of the meeting referred to, at which Mr. C. T. Newton took the chair, and which have already been very fully reported in the *Times*, commenced with the reading by Professor Jebb of the report on the financial position of the undertaking. The house, with library and lecture-room attached, has been built at a very moderate cost (about 3,000*l.*), Mr. Penrose having acted as honorary architect, and having now undertaken for a year at least the duties of Director of the School. In various ways, stated in the report, an income of 400*l.* a year is at present provided for, the University of Oxford contributing 100*l.* a year and the Hellenic Society another 100*l.*, the last-named subscription to be conditional on the provision of at least 300*l.* a year from other sources. Many of the learned bodies applied to for subscriptions replied that either they had no funds to spare from their own purposes, or that the conditions under which they held their property forbade such an application of it. Miss Harrison deserves to be specially named as having contributed, by her own efforts, the sum of 190*l.*, the proceeds of her lectures on Greek Vase Paintings, of which we gave some notice last year. All this, however, will not go very far towards carrying out in a worthy manner the objects of the institution, or enabling us to keep pace with the Germans in archæological work and archæological honours. Mr. G. Godwin put the very pertinent question, whether any help had been asked and was expected from the Government, a question to which the negative answer of the Chairman might have been anticipated, at least as regarded any "expectations." From Mr. Newton's account we gather that any application for help in such a matter from our benighted Government was considered so hopeless that it was thought better not to ask what was certain to be refused. A second suggestion by the same speaker, that the scheme would be furthered if the methods and terms of admission to the school were known, seems to have been the first hint given at the meeting that the whole matter was, after all, in a rather misty state, and that while asking people and institutions for pecuniary support, it would be at least logical and business-like to be prepared to state exactly what was the work to be carried on in the British Archæological School at Athens; whether it was to be investigation and relic-hunting, or instruction in art-history, or what. Sir F. Pollock supported Mr. Godwin in this, and hoped that the *modus operandi* of the school would be made public as soon as possible. This seems nothing more than ordinary common-sense; and it is somewhat odd, and does not say much for the practical and business-like temperament of archæologists, that things should have got to the present point without, as far as appears, any attempt to formulate a distinct statement as to the proposed objects and work of the school, which is one of the first things that any one who is asked to subscribe to such an undertaking would wish to

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know, unless he were a man very reckless of his cash.

The educationalist view of the subject was represented by Dr. Warre, the Principal of Eton, and Mr. Fearon, both of whom spoke from experience of the great help given to the comprehension and realisation of history by a knowledge of the actual objects made and lived among by the people who were the subject of the history. Dr. Arnold would have gone heart and soul with this: no teacher that ever taught was more earnest in the endeavour to give a picturesque realism to the otherwise dry bones of history.

To sum up these few remarks, we may record the present position of the school as this, that a managing committee is appointed, to be composed of (1) the three trustees and the treasurer *ex officiis*, and the hon. secretary; (2) of five members to be appointed annually by the general body of subscribers; and (3) of members to be nominated, one by each corporate body subscribing not less than 50*l*. a year to the funds of the school. The five members appointed for this year are Prof. Gardner, Mr. Gennadius, Prof. Jebb, Sir F. Leighton, and Mr. J. E. Sandys. Mr. Walter Leaf is Treasurer, and Mr. G. A. Macmillan Honorary Secretary. It is intended to open the school in November. We hope it may receive such pecuniary and other support as may enable it really to accomplish work such as may be an honour to the enterprise and scholarship of this country, and do something to take the conceit out of "those Germans."

NOTES.

THE programme issued by the Board of Trade as to the aims and objects of the new Labour Statistical Bureau does not lack comprehensiveness; and if carried out as proposed, ought to be the means of doing much good to the working-classes. The first paragraph in Mr. Giffen's official announcement refers to the compilation of a blue book detailing the statistics of wages for the last half-century. This, though highly interesting in itself, is, we venture to think, superfluous, as not affecting in any way the question of current wages, the main point on which information is most desired. The statistics of foreign labour are always valuable, as giving the opportunity of showing the artisans of Great Britain how little they have to complain of in comparison with those of other countries, both as to hours of work and the prices paid for it. Whether the lesson will be taken to heart is another thing, though it can scarcely fail to be useful. Another point of real value will be the collection and dissemination of information on the statistics of trade unions, the knowledge of which should be free and open to everybody. Secrecy in such matters is not only unnecessary, but positively disadvantageous, as giving room for suspecting the existence of facts which will not bear the light of day; and although a trade union is not a secret society, like that of the Knights of Labour in the United States, even the members of English unions have very little opportunity of knowing the proceedings of any but their own. It is by no means the first time that such an undertaking as a bureau of labour statistics has been mooted or attempted to be established in this country. A scheme almost identical with the present one was drawn up some half a dozen years ago by Mr. Alsager Hill and Mr. G. Phillips Bevan; but the difficulties of obtaining the information first hand proved too great for any private efforts, employers being too much occupied or too unwilling to answer questions, except those bearing an official impress. America has long recognised the immense importance of placing the subject under State authority, and although we have been a long time following her lead, let us hope that its undoubted value will be felt by all concerned.

WE have received from Mr. Honeyman, of Glasgow, a copy of a correspondence bearing on the recent "Barony Church Competition," in which he was an unsuccessful competitor, and in which he accuses the committee of having awarded the competition in defiance of their own instructions to architects. We are not disposed hastily to take up complaints of injustice on the part of unsuccessful competitors, architects being, after all, human, and disposed, like other men, to think themselves unduly slighted when others get what they wish for. But Mr. Honeyman is not a man to raise lightly an accusation of this kind out of mere disappointment; and it certainly appears to us that his charge as to the committee's decision has not received the definite and distinct reply that it calls for. It was stated, it appears, in the conditions of the competition, that the cost of the whole building was not to exceed 13,000*l*., including all charges. Mr. Honeyman's position is, that he did send in a design which could be executed for this sum (and this appears to be admitted on the other side), and that the selected design was admittedly estimated by the architect himself, Mr. Burnet, at 15,600*l*.; and this design the committee have selected, on the ground that they prefer it, and that, with the omission of the spire and some other portions, it can be executed for 13,000*l*. We have gone through the correspondence in the matter, and as it stands we cannot see that any sufficient answer has been given to Mr. Honeyman's charge. Of course, we need not add that to advertise a competition for a building to cost a specified sum, and then award the premium to a design which has exceeded the amount, is a gross injustice to those who have endeavoured to keep within the terms of the conditions. Mr. Pearson was the architectural adviser called in by the committee: can he throw any light on the rights of the case?

THE proposal to unite by a tunnel the defences of Portsmouth with the forts on the Solent, and with the Isle of Wight, is one that demands the most serious attention of every patriotic Englishman. The execution of such a project should not be allowed to depend on the contingency of a financial return. It is, of course, in the first place indispensable to have such an exact survey of the bed of the Solent, including borings to the depth of 50 ft. or 100 ft. below it, as shall enable the engineer to speak positively as to the practicability, at a reasonable cost, of the undertaking. That once established, the arguments in favour of the scheme are very strong. Half-way between Stokes Bay and Ryde Pier Head, we are told, the Sturbridge bank rises to within 18 ft. of high-water line. Here the military advisers of the Government wished to establish a fort, and the design was only abandoned from the fear that fresh water could not be obtained for the garrison. With a submarine communication, all questions of food, water, ammunition, or re-enforcements for a garrison would be easily solved; our line of marine defence at this point would be rendered impregnable; our iron-clad fleet would be set free from the duty of defending this vital pass; and, for the most costly of all defences, viz., a set of sea-going iron batteries, would be substituted a line of defences of which the first cost would be the main outlay, and the annual maintenance would be more cheaply effected than by any other method. Spread over twenty or thirty years, the result of the construction of such a line of defence would be a considerable reduction in the annual estimates.

IN the second issue of the new *Jahrbuch* of the German Archæological Institute, Dr. Helbig calls attention to an inscribed bust of Plato, as to the genuineness of which we need have no misgivings. The bust is inscribed with letters which are of the date of the Antonines, and the style of the work, which is hard and dry, confirms the date. The bust belonged to Signor Alessandro Castellani. At his sale it fell to Count Michael Tyskiewicz, and from his possession has passed into the Berlin Museum. Together with this bust, Dr. Helbig publishes a selection of other analogous heads, hitherto conjectured to be Plato, and now known as certain portraits. These are:—(1) a bust in the Capitoline Museum, much restored; (2) a head in the Villa Borghese, very near akin in style to the Berlin bust; (3) a double bust in the cellar of the Casino di Piero Ligorio. The head of Plato is back to back with that of Socrates; (4) a head in the Museo Torlonia, which has suffered much from the action of water; (5) a head in the "Galleria Geografica" of the Vatican; (6) bust in the Vatican Museum, falsely inscribed Zeno. To these, no doubt, now the type is clearly established, there will be added many other instances from public and private collections. Perhaps our first look at this genuine portrait will be only a disappointment: the man whose thoughts were of such matchless beauty was certainly not fair to see, nor is there about the face any of that Olympian calm we might expect to see; the forehead is contracted, with a troubled, worn expression, clearly marked in all the busts. Oddly enough, however, the only contemporary account in literature of Plato's personal appearance notes just this trait,—the comic poet Amphis speaks of him as contracting his brows like a snail in a shell, a very speaking image.

Ω Πλάτων
ὡς οὐδὲν οἶσθα πλὴν σκυθρωπάζειν μόνον
ὥσπερ κοχλίας σιμνῶς ἐπηρὼς τὰς ὀφρῦς.

Intellectual power is clearly evidenced by the broad forehead; the far-away abstracted look characterises well the speculative philosopher. The hair and beard are exactly of the fashion of the fourth century B.C., as seen on Greek grave-stones of that date, a further piece of evidence, if any were needed, that the Antonine bust is a copy of some contemporary work.

THE public is by no means satisfied that in Government work things are done as well as they might be. The recent narrow escape of the *Tyne* troopship in the late gale has called attention to the fact that, when surveyed after her safe arrival at Plymouth, it was found that work had not been done which ought to have been carried out when fully surveyed no long time ago. It was by the neglect of this necessary work that a number of valuable lives were jeopardised. On matters connected with the Army and Navy we have no criticisms to make, but when neglect in Government work, such as shipbuilding and ship repairing, is established, it necessarily arouses a suspicion in regard to other kinds of Government work, such as the erection and repair, the planning and the supervision of Government buildings. It was not very long ago since we commented on some slips in regard to new post-offices at Birmingham. Here is another example of carelessness on the part of some officials.

IN the last number of the *Athenian Mittheilungen* of the German Institute, Dr. Franz Studnizka publishes the very curious and archaic pediment sculpture, made of porous stone, recently found in the Acropolis. The fragments remaining clearly show that a fight of Hercules and the Triton was represented. There is little doubt from this that the Triton pediment is the fellow of the equally curious and archaic Hydra pediment found at no great distance. The Hydra sculptures are well known, and have proved fertile for controversy. The Triton pediment appears for the first time. The whole of one side of the pediment is filled by the Triton, his fish-tail curling down into the pediment angle in constantly decreasing spirals. A more naïve form of pediment composition it would be hard to conceive. These porous reliefs represent, in fact, a stage decidedly more primitive than even the pediment sculptures of the Megara treasure-house at Olympia, which hitherto we have been taught to regard as the "incunabula" of pediment composition. They are the more interesting because they present marked analogies to the compositions of early black figured vases, and, moreover, they are of undoubted Attic work. To what building they belonged is still a problem.

IN reference to the circular about "Federation," about which two letters were printed in our last, the Institute of Architects have issued a letter to their members asking if they have signed the circular referred to under the impression that the Institute was represented on the committee which issued the said circular. A great many replies have been already received, and something will probably be heard about them next week. In the meantime it is sufficient to say that an attempt appears to have been made to obtain the signatures of members of the Institute to a document with which they would have had nothing to do had they known from whom it really emanated.

ANY ONE who walks along Shaftesbury-avenue will be struck by the announcement, appended to various little windows in somewhat squalid structures, that these are "ancient lights." It is as well to point out that such a proclamation in no way gives any validity to a claim to such a right unless the person who claims it can substantiate it by evidence. There seems to be a kind of impression abroad that the mere fact of such an announcement is sufficient to lay on a person obstructing one of these lights the burden of proving that it is not ancient; whereas, the burden of proof is, in fact, the other way. Judging from the position and character of the windows now exposed to view in Shaftesbury-avenue, it may possibly be doubted whether they ever had any very large amount of light, and we should not be surprised if some litigation were to arise from these claims.

FROM a circular dated "Venice, July 20th," but which has only just been forwarded to us, we learn that the Sixth Congress of Italian Architects and Engineers will be held at Venice in the month of September, 1887; the precise date apparently is not fixed yet. The congress will discuss, at seven successive sittings, subjects grouped under the following heads: (1) Civil Architecture in relation to hygiene, economy, and legislative enactments; (2) Bridges, Roads, and Tramways; (3) Construction and Working of Railroads, partly in relation to war service; (4) Hydraulic Engineering, in relation to river and harbour work, and industrial operation; (5) Machinery; (6) Engineering considered in its various applications to war service; (7) Surveying, topography, agricultural engineering, &c. Professor Domenico Turazza will be the President, Dr. Paulo Fambri and Dr. Emilio Pellesina, Vice-Presidents.

IT may be as well to warn householders that those who have not already looked to their roofs and gutters should do so at once. There is a fashion of spring cleaning and spring painting. It would be well, in the long run, for the pockets of householders if there were also an autumn examination of roofs and drains. A great deal of the mischief which is laid at the door of frosts, thaws, snows, gales, and rainstorms is attributable to a want of proper inspection of houses. It is already becoming late for such examination, but late is better than never.

THE *Bulletino della Commissione Archæologica Comunale di Roma* (1886, fasc. 8) reports the discovery of a large number of marble statues at Rome. Among many of subordinate interest, we may note the following,—a torso of Artemis, somewhat above life-size and of excellent work. The statue is in several fragments, but it was at once seen that the type is the same as the celebrated "Diana de Versailles" (Diane à la Biche), now in the Louvre: the stag which accompanies the goddess has been found, broken into several pieces. From the report of the style we may hope that this discovery will lead us a step back towards the reproduction of some great original. Further, of great interest is a statue (unhappily headless) of a "Running Girl," analogous to the well-known "Running Girl" of the Galleria dei Candelabri in the Vatican. The new statue is reported as of the late fine period, whereas the Vatican replica is of archaic, or, more probably, archaistic type. Further, three plinths of statues have been discovered on the Esquiline, all of which are signed with the sculptors' names. In the next issue we are promised a facsimile of these signatures, hitherto unknown in the history of Greek art. Till then we reserve our fuller notice.

SOME time ago we reported that the Acton Local Board had come to a provisional arrangement with the Native Guano Company for the treatment of the sewage of Acton under the "A B C" system. But it appears from the correspondence read, and the statements of members at the meeting, on Tuesday, of the Acton Board, that a rather curious hitch has occurred in the progress of the more detailed negotiations. The point at issue obviously possesses some interest to Sanitary Authorities along the Thames Valley, and special interest, it may be said, to the Thames Conservancy Board, one of whose duties is to preserve, as far as possible, the Thames from pollution by the inflow of crude sewage. It is stated that the Native Guano Company wish inserted in their agreement with the Board a clause allowing the company during floods to pass the crude sewage direct from the sewers to the Thames at the outfall, Chiswick Eyot, thus avoiding passage through the works and proper clarification. There is necessarily greater expense incurred in the treatment of the sewage during floods than normal weather, owing to the undue proportion of surface-water with which the sewage is charged. But it is certainly matter of surprise that a public company should attempt, as they appear to do in this instance, to fly in the face of the Act of Parliament, which prohibits the inflow of unclarified sewage into the river. The Acton Board are not likely to assent to these hazardous terms, which would eventually lead them into trouble, not only with the Thames Conservancy Board, but the Chiswick authorities and residents near the outfall. The Acton Clerk has accordingly been instructed simply to acknowledge the receipt of the latest communication of the company on the subject. With the gradual construction of efficient drainage systems on the part of sanitary authorities along the lower Thames valley, by which the sewage from that wide area is clarified before its fall into the river, a material improvement in the purity of our great water-way is hopefully expected; and if any of these Local Authorities are disposed to entrust the treatment of their sewage to a company it is to be hoped that they will not assent to terms such as those indicated above.

THE last news from the Acropolis excavations reports the finding of a staircase, the exact purport of which has not yet been made clear. Twenty-two steps have been laid bare within the Acropolis walls, and it is conjectured that the continuation of the staircase was cut down the citadel rock itself. It was hoped for a short time that this might prove to be the staircase by which the Persians climbed up, but a little further consideration caused the theory to be abandoned, as the fortifications on which the steps depend are of Cimon's date. Whether his staircase succeeded some early one is as yet not clear. A few scattered sculptures of porous stone, chiefly decorative (lions' heads and the like), have been found by the side of the steps.

THE "Report of the Ordnance Committee, with special Associated Members, on the accident to 12-in. B. L. Gun, Mark II., on board the *Collingwood*, and construction of B. L. Guns" is not a document which conveys any very definite idea to the general reader. Two pages of "Abstract of rounds fired from the 12-inch guns" simply give the weights and marks of the powder burned. That 378 rounds should have been fired from thirteen guns without blowing off the chase is not such a wonderful performance. Why, after firing only nine rounds, gun No. 16 blew off its chase, is not satisfactorily made out. The committee find that there was a want of uniformity in the metal of which the chase was composed; that the gun had not been annealed; and that the chase had not been hooped. It does not say why these omissions were discovered so late in the day; nor do the committee furnish the means, by giving a section or sketch of the gun, by which any expert can form an opinion as to the merit of the design which so signally failed. Gun No. 16 came to grief when fired with three-quarters of the service full charge of powder. Such was the simple fact, and the report does very little more than repeat it.

MISS HARRISON announces a course of four lectures on the myths of Attica, as seen on Greek vase paintings, to be given in the South Kensington Museum Lecture Theatre on November 17 and the three following Wednesdays, at 5·15 p.m. Those who have attended any of Miss Harrison's previous lectures on Greek vase paintings will be aware of the high interest with which she is able to invest her subject. During the month of January Miss Harrison intends forming a class in Paris for the special study of the vase paintings in the Louvre; and, during April, a class will be formed in Athens for the study of Athenian monuments.

WE have to note another cynically candid business circular sent round to architects and engineers, by a Birmingham firm of iron safe makers, containing this delightfully explicit memorandum (the italics are our own):—

"*In order to induce you to introduce our* Safes, Iron Doors and Frames, Strong Rooms, &c., amongst your clients, we shall be pleased to allow you an Extra Discount of 10 per cent. on all orders received by us through you, or influenced by you, in addition to the ordinary discount of 40 per cent. allowed by us to non-professional customers.

Thus on a safe or iron door which at list price would cost say..... £25 0 0

We allow ordinary trade discount of 40 per cent.	£10 0 0	
Extra architect's commission, 10 per cent.	2 10 0	
		12 10 0
Reducing net cost to.....		£12 10 0

Terms: free delivered to any address. Cash in one month.

Trusting these liberal terms will speedily *enable you to favour us with some orders*, We remain, yours faithfully, S. WITHERS & Co."

So that the architect, whose duty it is to see that his client has a strong-room of the best make and security, is to be regulated in his choice, not by the wish to find the best article, but by the "liberal terms" which the authors of this precious circular offer him for preferring theirs. Of course, the real result is that no architect can now specify safes by "A. Withers & Co." without laying himself open to the suspicion, whether justly or not, of a wish to handle their money. Two architects have sent us this circular with a request to comment on it, one of them remarking that the sending such a letter to an architect was "a scandal," as it certainly is.

THE NEW "MAISON DE REPRESSION," NANTERRE.

UNDER the title of the "Vicissitudes of a Royal Château in France," we described, a year ago, the "Depôt de Mendicité" of Villars-Cotterets, a hybrid kind of establishment, at once prison and hospital, in which administrative Vandalism seems to have enjoyed the amusement of mutilating, under the pretext of successive improvements, the most interesting remains of French Renaissance. As a contrast, we describe to-day a somewhat similar establishment newly erected, also of the mixed hospital and penitentiary character, but appropriately contrived for this double destination, not by pulling about the work of the past, but by making the best of the science of the present.

The Maison de Repression at Nanterre is about six kilomètres from Paris, in a flat and sufficiently unattractive site, but with its principal entrance facing Mont Valerien. The exterior is of a severe architectural character, but the façade, in good ashlar stone, has not the desolate appearance of many buildings of its class. We enter through a fine gateway,

which does not realise the French proverb, "Triste comme la porte d'une prison," thence into a vaulted porch, giving access to the court, at the further end of which is the administrative building, three stories high, and flanked by arched openings, connecting it with the laundries, kitchen, and other offices.

Before going further, we may observe that the establishment (of which we give a complete plan as well as a view of the infirmary block), is a collection of thirty buildings united with one another by more than 1,300 mètres of galleries, surrounded by main boundary walls in rough-dressed stone, enclosing a total area of 120,000 square mètres. The constructions, which cover about one-fourth of the whole ground, are divided into two principal portions or quarters, one for 1,000 men the other for 500 women; though this accommodation could, if necessary, be considerably extended even in the present buildings. To these must be added the infirmary for 300 sick.

Each quarter is subdivided into three sections,—(1) Prisoners sentenced to "peines correctionnelles"; (2) Vagrant mendicants, "Individus surveillés"; (3) "Individus en hospitalité." These divisions, dictated by the State, were coupled with the order for a careful orientation of the building so as to allow the east and west winds to sweep freely the courts and spaces between the buildings.

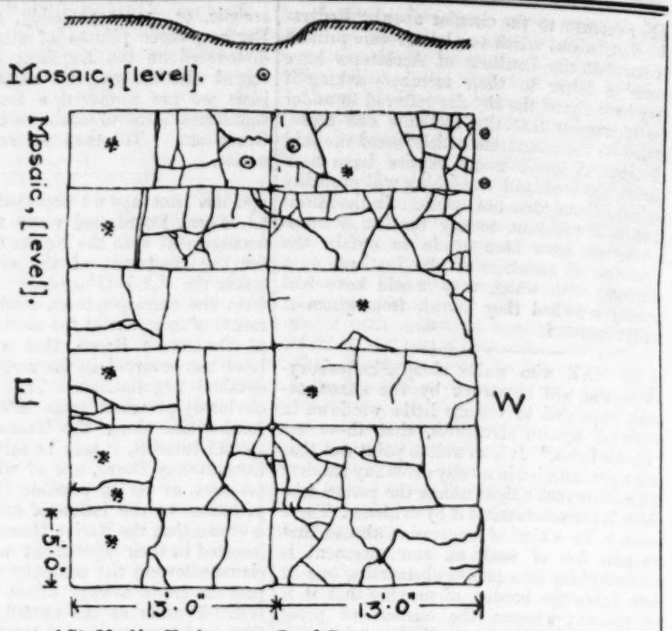
The architect, M. Achille Hermant, has accordingly placed the two main sections to right and left of the centre, in accordance with these conditions, placing between them all the services common to both quarters.

The central block, the upper stories of which are reserved for the *personnel* of the administration, contains on the ground floor the office of the director, the offices and archives, the library, the record office, the *conciergerie*, twelve cells for prisoners waiting, and speaking cells separated by grilles, in which visitors can communicate with the prisoners by speech alone.

If we advance from the central pavilion we find at each end of it an immense gallery, which extends to a length of 300 mètres, communicating with all the buildings. Other galleries at right angles to this run round the courts and give cross communication.

The great court, now a grass-grown waste, will eventually be transformed into a garden for the use of the *employés*. The buildings devoted to them present from here the appearance of a terrace built on an arcade, and opposite to this stands, or should stand, the chapel, which, however, is still in an unfinished state. It was to be Romanesque in style and with polychromatic decoration internally, but at present there are only roofless walls and windowless openings. The explanation of this is that when the building was commissioned, or rather when the competition for it was held, freedom of religious worship was admitted, and religious communities were not proscribed by the State. The chapel then made an integral part of the programme to which competitors were to conform. The Conseil-Général of the moment, however, and more particularly some of the irreconcilables of the extreme left, have bitterly reproached M. Hermant for having dared to raise a religious edifice in the midst of an establishment of this kind, and the building of the chapel has been officially stopped when two-thirds finished, and thus is produced this melancholy spectacle of the abandoned building in the midst of the courtyard. It is difficult to understand such a bigotry of anti-religious zeal as this; it would be better, at all events, to finish the building, and then "laïcise" it, rather than leave the half-built walls to be disintegrated by rain and frost.

On each side of the first court are the cells or prison buildings. The cells open from tiers of balconies on each side of a central gallery or bay, the whole height of the building. Each cell is 4 mètres long by 2 wide and 3 high. Each cell contains a lavatory and a water-closet, which latter is supposed to be hermetically sealed against any leakage of air into the cell, which is further guarded against by a special system of ventilation of the closets. Each cell has also a sink for waste water, which is carried to the sewer; no less than 6,000 mètres of Doulton ware pipes have been fixed for the connexions to the sewer, which (we regret to note) after a course of about a mile, eventually discharges into the Seine.



The Pavement of St. Mark's, Venice: ✳ *Level Portions*; ⊙ *Depressed Portions.*

Each cell possesses also an air-inlet pipe and a heating-pipe, a gas jet controlled from the outside, and an electric apparatus communicating with the indicator in the "Pavillon de Surveillance," the upper platform of which, of ten-sided shape, is made to serve as a chapel; the doors being partially opened and so secured that each prisoner can take part in the service without seeing or being seen by his neighbours. The doors are furnished with wickets for passing in food.

Between each cellular building extends a rectangular court, of which the divisions, following the "panoptic" central arrangement, serve for the solitary promenades of the prisoners, isolated as much as in their cell, and unable either to see any one or to get out of sight of the prison officers.

These buildings are lighted at each end by very large arched windows occupying their whole height.

The buildings of the *Régime en Commun* are, like the rest, arranged on the left for women and on the right for men, with large interspaces for circulation of air. Above are the dormitories furnished with lavatories much better and more comfortable than those of French barracks, or even of *lycées*. Beyond the chapel (which, by the way, is flanked by two little oratories for non-Catholic worshippers,—will these at least be spared?) is an elegantly-designed pavilion in two stories with Gothic windows; and behind this building,—which constitutes the greatest offence of M. Hermant against the Conseil-Général, since it was intended for members of religious communities,—is a green enclosure surrounded by a wall, and with an arcaded cloister running round; the architect, no doubt rather weary of the stern practical character of the rest of the building, having apparently chosen this opportunity to give a little scope to his fancy and invention. At the back of a third court is the large infirmary building, the general character of which is sufficiently shown in the view of it which we give. (See lithograph in present number.) The ground-floor contains the doctors' rooms, dispensaries, and sitting-rooms. The internal arrangements and furnishing are what may be called luxurious. The principal entrance is decorated with sculptural accessories, and three large arches give access to the grand staircase, which, at the first floor, leads to the "Salle des Consultations," and along corridors to the large and well lighted and ventilated dormitories. There are also separate dormitories, to be used either for invalid prisoners or for patients suffering from contagious diseases. Two lifts provide for the ascent of patients and for the removal of dead bodies in case of death in the infirmary; these latter are conveyed by a subterranean passage to mortuaries, previously to interment in the special cemeteries of the establishment, situated without the walls.

The baths pavilion, large enough for all the needs of such an agglomeration of inmates, terminates the last court, and beyond this and outside the boundary are the machine-buildings for the service of warming and ventilation on Geneste & Herscher's system; these buildings have no communication with the main buildings except by a double subterranean gallery extending the whole length of the buildings, and which is not the least curious portion of the edifice. By these passages gas, water, steam, and compressed air will be distributed to all parts of the establishment. There are eight boilers and six steam engines, three for the ventilation of the infirmary and three others for *bâtiments cellulaires*.

Such is the general outline of the plan and construction of the Maison de Repression of Nanterre, the cost of which will reach eleven millions of francs; not an extravagant cost considering the number and importance of the buildings, the rise in the price of labour in the last six years, and the special means taken to secure the best sanitary conditions and provide special opportunity for repairs as often as required.

M. Hermant has for a period of nine years given his thought and care to planning and superintending this work, not without many of those vexatious interferences and "free fights" which an architect carrying out a large Government work has almost always to put up with; but he has succeeded in producing a building which may fairly be said to be a remarkable example of its class, and which is well worth a visit of inspection.

THE PAVEMENT OF ST. MARK'S.

The diagram shown above is traced from a sketch made some time ago by our correspondent "Delta," whose letter we printed last week. It represents the slabs of grey marble in front of the choir of St. Mark's, with all the cracks in them, as sketched on the spot, showing that where the marble remains level, or tolerably so, it is uninjured, and that at the parts where it is undulated it is full of a network of cracks. This little bit of evidence of cause and effect seems effectually to dispose of the theory maintained by the late Mr. Street and by Mr. Arthur Street, that the undulations of St. Mark's pavement were intentional and symbolical.

New Monument at St. Petersburg.—A new monument, commemorating the Russian victory over Turkey, 1877-78, similar to the celebrated "Sieges" monument in Berlin, raised in memory of the Franco-German war, is to be unveiled this autumn at St. Petersburg. The monument which has a height of 75 ft., consists of a pedestal 18 ft., supporting a single column 57 ft. in height, crowned by an allegorical female figure, symbolising "Victory." The monument will be ornamented with 104 captured Turkish guns, which are gilded.

EARLY SCANDINAVIAN ART AT SOUTH KENSINGTON MUSEUM.

THERE has been recently added to the South Kensington Museum a series of casts of objects of ancient Scandinavian art, which will be regarded with no little interest by English students, since they not only indicate a class of design of great novelty but little known away from the north of Europe, but because they are, perhaps, not unlike what once existed in our own Saxon churches.

Fig. 1.

Fig. 2.

Fig. 3.

These objects have been acquired by the museum authorities by the system of exchange with foreign museums, which is working well and producing mutual benefit. They are arranged in the large hall to the east of the present temporary entrance, close to some other casts of Scandinavian and Northern work, the whole now forming an interesting group for study.

Fig. 4.

Fig. 1 is a font, the original of which is now in the National Museum, Stockholm, but formerly in the church of Gällstad in Vestergötland. It is square on a square base, the bowl, which is small, being circular, and, like the other fonts to be described, with sloping sides and a flat bottom. The outer sides are covered with very diverse patterns in low relief. The sketch indicates the nature of the designs, and it but remains to say that the third side, not shown, is filled in with foliage; and the fourth with a peculiar entwined triangular pattern, of which there are several examples in work of Saxon date in England; one of these, the cross at Gosford, is illustrated at the Museum by a cast, which is placed adjoining this font, in a position therefore admitting of immediate comparison, indicating the similarity of the work of the two countries. There is an inscription in Runic characters which have been read as follows:—"Andreas made the bowl." The date is given as the twelfth century, but the patterns are similar to what may be found on much earlier works, the Gosford cross, in fact, being of greater antiquity. There are four small incised crosses on the upper part. The height is 2 ft. 8 in., the width being 2 ft. It will be noticed that the patterns are irregular and the lines are not straight.

Fig. 2 is a circular font on a circular base, the latter ornamented with large heads in bold relief. The upper part is covered with an effective pattern in low relief, very irregularly worked. The original is also in the Stockholm Museum. The date is the twelfth century. The height is 2 ft. 4 in., and the diameter of the upper part is 2 ft. 2 in.

The finest of the three fonts is shown by sketch, fig. 3. The whole of the composition is covered with elaborate strap work in flat bands raised slightly from the surface, the upper part being filled in with a series of nondescript quadrupeds arranged face to face, each contained within a niche having a depressed semicircular arch. The original is in the Stockholm Museum. The height is 2 ft. 11 in., and the diameter 2 ft. 3 in. The bowl is 11 in. deep. This font is also assigned to the twelfth century. Close to these three examples, a cast of the Bridekirk Font, Cumberland, has been placed, and the similarity of the work is noteworthy, although the design is very dissimilar, the latter being a square block without a base, each face carved with patterns in low relief.

Figure 4 shows another object acquired by exchange with the authorities of the National Museum, Stockholm. It is a solid gravestone, unlike anything in England, although its form may remind us and no more of the Saxon hog-backed stones, of which a few examples remain in the north of England. It is shaped in the form of a church, consisting of a nave with a

Fig. 5.

sloping roof, the side shown in the sketch having a series of seven arches, while the building ends in a semicircular apse. The sloping roof is covered with good interlaced foliage and strap work. The side arches contain figures who approach, with uplifted hands, the figure of the Saviour, sculptured in the fourth panel, there being an angel in the third, apparently a sick man in bed in the second, and a kneeling figure in the first. An inscription on the fillet, which occupies the place of the eaves, has been deciphered. It states that it was made by Karl in honour of his relative Bjorn. The opposite side is only partially covered with sculptured quadrupeds with wings. This is also Swedish work of the first half of the twelfth century, the original being now in Stockholm Museum, having been formerly in the churchyard of Botkyrka in Södermanland. The length is 5 ft. 7½ in., the width at the east end 1 ft. 7 in., and the height 1 ft. 7½ in. The patterns can be made out, but, owing to exposure, they are observed with difficulty. As in other instances, the lines of the work are very irregular.

The other casts, examples of Scandinavian work in the Museum, are deserving of careful study, since they bring to our notice in a very graphic manner the remarkable wooden churches of these districts, buildings that are becoming fewer in number, as the collection testifies. Thus there is a cast of the remarkable doorway of the Church of Flaa, demolished in 1854; another from the Church of Sanland, demolished in 1860; and some others. These doorways consist of narrow openings, of great height for their width, having mostly semicircular arches springing from a roll moulding forming a pilaster with caps and bases, the whole of the wall space, so to speak, and the arch itself, being covered with elaborate patterns of entwined snake-like reptiles and elongated animals; the work being cut in pine, and executed with remarkable technical skill, all the more worthy of observation from the very early date assigned to these works by northern antiquaries, namely, the eleventh or the early part of the twelfth centuries. The latest of the series, and the most elaborate, a doorway from the Church of Aal in Hallingdal, about A.D. 1200, is a mass of deeply-sunk and boldly-designed carving, the leading lines of the griffin-like forms being clear and well defined. Other nameless animals sit bodily on the caps of the pilasters, carved in bold relief. The original of this fine work is in the Christiana Museum. The doorways referred to are similar to better-known examples at the wooden churches at Borgund, Hitterdal, and Urnes, but are more elaborate.

Fig. 5 is a sketch of another class of work. It represents a part of the door-posts of the Hof Church, Solöer, Norway, the original being in the Christiana Museum. The effective nature of the work is sufficiently shown by the sketch, but English students may be surprised at the remote date assigned to it. Notwithstanding the well-developed foliage, which is remarkably like our own Early English work, it appears that it was executed in Norway in the tenth century. This date supposes the existence of the style at the introduction of Christianity. If this early date can be sustained, we must look for the beginnings of our crisp twelfth and thirteenth century foliage from an unexpected source.

The works in wood may be taken as illustrations of the appearance of many of our own Saxon churches constructed in that material. The casts from Christiana were presented by the authorities.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS:

EXAMINATIONS.

THIS Association held its second examination of candidates for the offices of Municipal Engineers and Local Board Surveyors at St. George's Hall, Liverpool, on Friday and Saturday, the 1st and 2nd instant. The examiners in the various subjects as set forth in the syllabus were,—1st, Engineering as applied to Municipal Work, Mr. W. G. Laws, M. Inst. C.E., City Engineer, Newcastle-on-Tyne (Past President); 2nd, Building Construction, Mr. R. Vawser, M. Inst. C.E., Manchester (Past President); 3rd, Sanitary Science, Mr. E. B. Ellice-Clark, M. Inst. C.E., County Surveyor, West Sussex (Member of Council); and 4th, Public Health Law, Mr. J. Lobley, M. Inst. C.E., Borough Engineer, Hanley (President of the Association). Twenty gentlemen offered themselves for examination, and of these the following satisfied the examiners, and will receive the Association's certificate of competency:—

Sykes, E., Reddish, Lancashire.
Beard, E. T., Lincoln.
Mallinson, T., Selby, Yorkshire.
Thomas, R. J., Carnarvon.
Ball, G. Scarborough.
Young, Wm., Pendleton.
Pickering, J. S., West Bromwich.
Crowther, J. A., Leeds.
Turner, V. H., Leeds.
Jameson, M. W., Leeds.
Brownridge, C., Leeds.
Silcock, E. J., Leeds.

The next examination will be held in London in April, 1887, particulars of which will be duly published.

Illustrations.

WORKHOUSE FOR THE ABLE-BODIED POOR OF THE HOLBORN UNION.

THIS establishment, erected for the accommodation of about 1,000 able-bodied paupers of Holborn Union, is situated at Merton-lane, in the parish of Mitcham, Surrey. The foundation-stone was laid on the 14th of April, 1885, and the building was opened on Thursday last. Both ceremonies were performed by the chairman of the Board, Mr. Benjamin Garrod.

The Workhouse buildings were designed, and their erection superintended, by the Guardians' architects, Messrs. H. Saxon Snell & Son. The builders were Messrs. Wall Brothers, and their estimate was accepted as being the lowest of the eight tenders sent in competition for the erection of the buildings.

The greater part of the engineering works of the Union Buildings, as the heating, cooking, and laundry apparatus, has been executed after competition with other firms by Messrs. May Brothers; the gas-pipes and fittings have been in like manner executed by Messrs. Berry & Sons, and the various sanitary and other apparatus have been supplied by Messrs. Bolding & Sons, Wilcock & Co., Doulton & Co., Bradford & Co., Macfarlane & Co., Bacon & Co., Hawke & Son, and Thomas Elsley. The wood block flooring has been laid by Mr. Roger Lowe, and the pavings of yards and outside corridors by Mr. Alfred Walker, of Leeds.

General Arrangement.

As will be seen, the general arrangement of the buildings is upon what is known as the "block system," each department being a detached and separate building, connected to the others only by open covered ways. Many hospitals and infirmaries have been erected upon this system of late years, but it is believed that this is the first attempt to apply the principle in its entirety to a workhouse.

The establishment is approached from Merton-lane through two gateways,—the one for carts, which gives access to a road that encircles the whole of the various blocks of buildings, and the other for foot passengers, who at once enter the receiving-house, containing the porter's office and residence, and a waiting-room, also probationary wards for the temporary accommodation,—pending their admission into the body of the house,—of twelve inmates of each sex (twenty-four in all). Bath-rooms and clothing-stores are also provided here, together with arrangements for disinfecting and washing all personal clothing, before being admitted into the house. In the rear of this block is a dead-house and post-mortem room. Passing through and out of this receiving-house, a covered way is entered, which leads to the various blocks of building situated on either side of it.

On the left are four three-storied buildings, each fitted for the reception of 112 male pauper inmates (448 in all), and between each of these blocks, one-storied buildings are provided for use as workrooms, whilst the intervening spaces form enclosed airing-yards.

The central one-storied building is reserved for workshops, such as wood-cutting, stone-breaking, and oakum-picking; but this has not yet been erected, as it is uncertain, until the establishment has been brought into use, what description of labour will be most remunerative in this locality.

The covered corridor terminates at the furthest of the block of buildings just described, but it is continued onwards by a raised and paved pathway leading to the Infirmary,—an entirely detached building, planned for the reception of thirty inmates of each sex (sixty in all).

Passing through to the opposite end of the infirmary building, a pathway and covered corridor similar to that last described returns and gives access in like manner to four three-storied buildings, each providing accommodation for 112 pauper (but in this case female) inmates. Work-rooms and airing-yards, corresponding to those on the opposite side, are also provided, but the central one-storied block is designed for the use of twelve married couples.

Between this outer ring of buildings, and separated from them by the encircling cart-road, are five blocks of buildings. The one facing Merton-lane contains the principal offices, viz., the Board and committee room, the master's and matron's and the assistant-master's and matron's residences, and also the dispensary. In the rear of this building is a recreation-ground, with tennis-lawn for the use of the officers; and beyond it a block containing the dining-hall, kitchen, and general store-room. Then a roadway intervenes, and on the other side is a building containing the laundry and washhouse, with coal-stores, engineers' shops, and furnace-rooms. At each angle of the rear portion of this building is a bath-room for the use of the officers. On the opposite side of the roadway, running past the back of this building, there is a water-tower, on the upper part of which is placed the tank through which the whole of the water for the supply of the various buildings passes. The basement story of this tower is fitted with two cells for the temporary detention of refractory inmates.

Between this tower and the infirmary there is a large space of ground, upon the central portion of which it was intended to erect a chapel; but the Guardians have determined (at any rate for the present) to make use of the dining-hall for this purpose. Of this hall an interior view is subjoined.

Cost.—The total cost of the buildings, including fittings, laying-out grounds, boundary walls, and drainage, also professional fees and clerk of works' salary, is estimated at 66*l.* per inmate.

Heating.—The receiving-house, officers' and day rooms, married couples' quarters, and the front administrative offices are warmed by means of open fires; the work-rooms by Musgrave's slow combustion stoves, and the dormitories generally are heated by means of hot-water pipes which run round the side walls next the floors. These pipes are all heated from the furnaces near the engine-house, and these furnaces also provide steam for the heating pipes in the dining-hall, which are carried across and beneath the floor in an open trench covered with gratings; they also traverse the two side walls above the floor line.

Gas.—Works are in course of erection on adjoining ground for the manufacture of the gas required for the use of the new workhouse, and also for the adjacent schools. The gas will not only be used for lighting the buildings, but also for heating the laundry closets, the disinfecting chambers, and refractory cells. It will also be required for the Otto gas engines of the laundry and of the water-softening apparatus. The mains are, however, as a matter of precaution, connected with those of the Local Gas Company.

Water Supply.—All the water for use in the building will be supplied from an artesian well in the adjoining school grounds, but before reaching the buildings it will be passed through a patent water-softening apparatus now being erected by Messrs. Atkins & Co. It is anticipated that by the use of this apparatus a great saving will be effected in the quantity of soap and soda used in the establishment. The softened water will be pumped into a tank, situated on the upper part of the tower in the rear of the laundry block, and from thence it will descend by cast-iron pipes for the supply of the various cisterns in the lower parts of the buildings.

The sinks, baths, and lavatories throughout the building are supplied by hot water heated by steam pipes running from the furnace-rooms in the rear of the washhouse and laundry.

Drainage.—The drainage of the buildings is effected by means of two deep drains carried beneath the roads running down either side of the central administrative blocks, and cross drains run into those from between the yards and roads separating the various blocks of buildings. Both of these main drains converge under the lawn in front of the building, where there is a ventilated manhole, and a syphon-trap for cutting off any foul gases from the sewer that runs down Merton-lane. There are, however, additional ventilated manholes at other important connexions with the cross drains, and many inspection pits fitted with air-tight covers. At the head of the southern main drain next the boundary-wall in the rear of the infirmary, a large tank fitted with Doulton's flushing apparatus is provided for periodically cleansing this length of pipe. The main drain beneath the northern road receives all the drainage from the schools, and this is occasionally flushed by the letting off of the water from the swimming-bath of that establishment. The rain-water is conveyed away by a separate system of drains. All drains are stoneware, and those of the two main drains are "Boulnois" patent pipes, 9 in. and 12 in. diameter. The other pipes are ordinary socket-pipes, generally 6 in. diameter. All rain-water pipes, and bath and sink wastes, discharge over grated gullies, especially made with angle outlets by Messrs. Bacon & Co.

SCULPTURE: "CLEOPATRA."

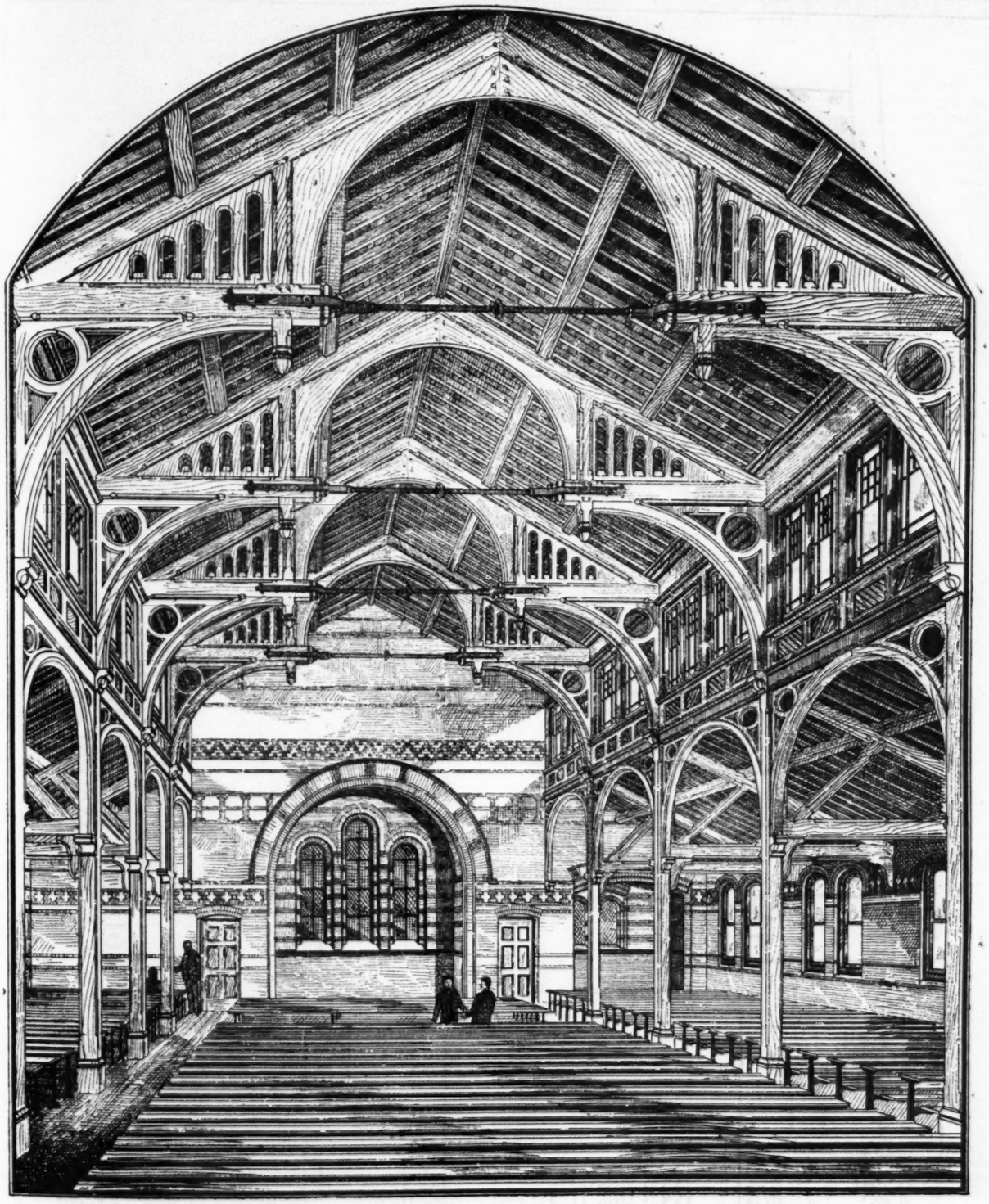
WE give an illustration this week of the very fine and impressive figure of the dying Cleopatra, by Mr. G. A. Lawson, which was exhibited in the octagon hall of the Royal Academy two or three years ago. It is at present in the Edinburgh Exhibition, where the photograph was taken from which the present illustration is reproduced.

KENTISH COTTAGES.

AMONGST so much that is charming to be seen in journeying through the fair and fruitful county of Kent, the picturesque cottages, whether clustered together, as at Ightham and Leeds, or dotted here and there on the roadside, form a pleasing, and to the architect and artist an important feature, worthy of more than a passing notice; for, whether they be constructed of timber and plaster, brick or stone, or, as in some few instances, a combination of all four, including a bit of tile-hanging, there is always something about them satisfactory, giving the impression that each one is just the right thing for the position it occupies. This feeling, no doubt, gathers strength from the surroundings of these humble homes; for where has Nature been more lavish, where do creepers climb up and cling to weather-stained walls in more luxuriance, or gayer flowers bloom more beautifully, than within the mossed and lichened stone walls which form the boundaries of the patches or garden ground in which these cottages stand?

Though it is probable one might search through the whole county without finding two of these cottages exactly alike (unless it were some modern imitations), there are features which occur so frequently as to indicate a particular liking for them on the part of the builders.

The most noticeable is shown in the sketches from West Malling, East Sutton, and Leeds (the latter is now incomplete, part of it having been taken down and replaced by a lean-to on the farther side), which have, on the upper story, two projecting wings at either end of the front of the building, carried on heavy joists and curved brackets at the angles. Between these wings a bay of one or two stories is carried up, but quite as frequently the recess



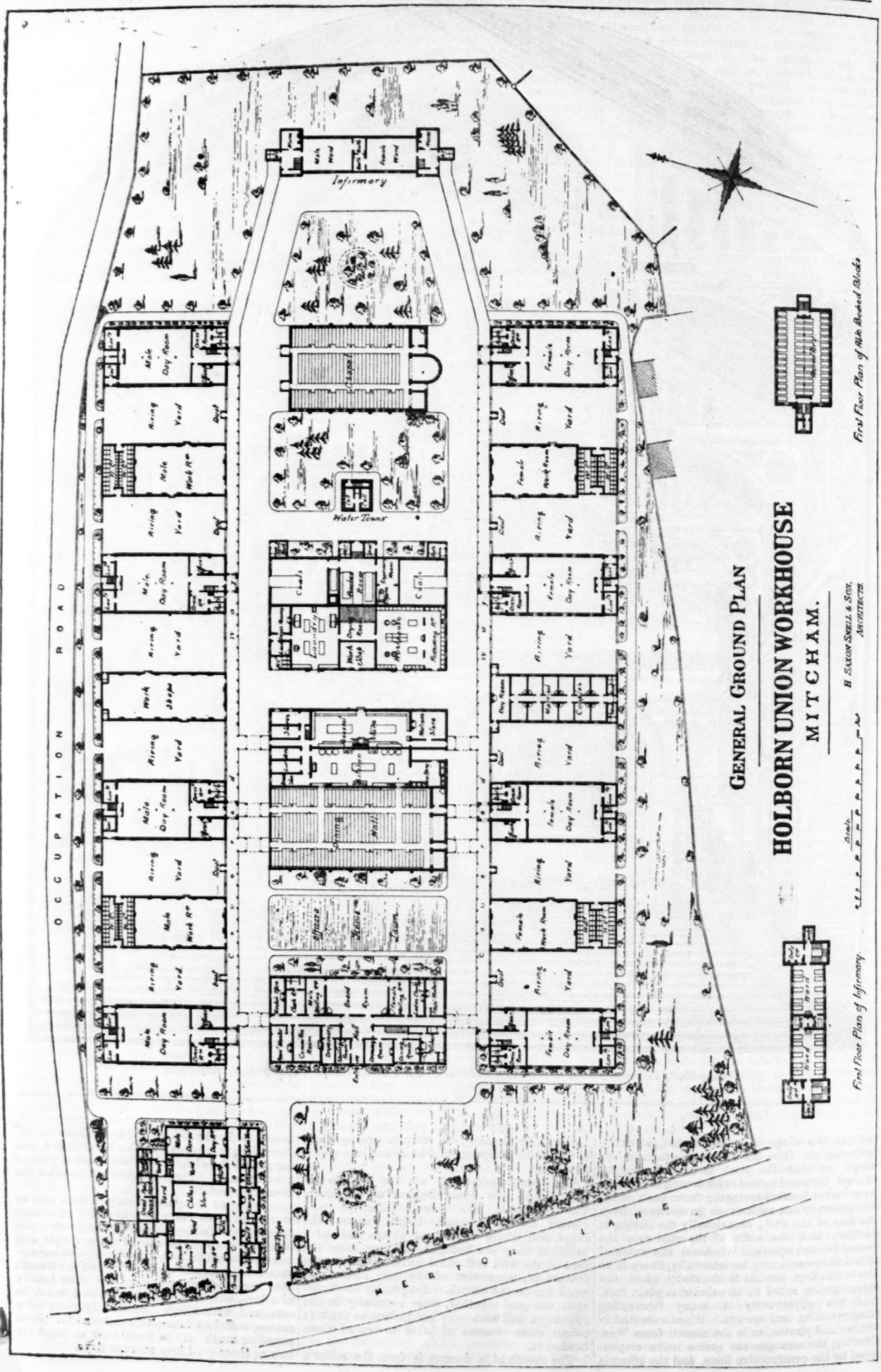
Dining-Hall, Holborn Union Workhouse, Mitcham.—Messrs. H. Saxon Snell & Son, Architects.

between the wings is uninterrupted, a coving springing out from the wall to the face of the wings, so that the roof is carried straight through from end to end; this coving is relieved by a curved bracket springing from each wing, and generally one somewhere in between from the face of the wall; occasionally the coving is omitted, and the soffit of the roof over the recess finished square. Whatever the value of this arrangement may be internally, there is no doubt its effect outside is decidedly good, the wings giving relief to an otherwise plain face, and the opportunity of many interesting shadows being cast upon it. When executed in timber and plaster, as in the sketch from West Malling, the arrangement seems to be emphasised by the constructive lines, and the effect is particularly pleasing. A simpler arrangement is where the wings are tile-hung and the recess plastered.

The roofs generally are as simple as possible, of one span, hipped at the ends. The chimneys are usually massive and carried up to a good height above the ridge, and where they occur at the ends of a building, they are brought well out from the face of the wall and made quite an important feature of, suggestive of the cosy corner and wood fire on the hearth. Frequently brick and stone are used together, more especially in the chimneys, and with very good effect as regards colour, three courses of brick to two of stone bonded in.

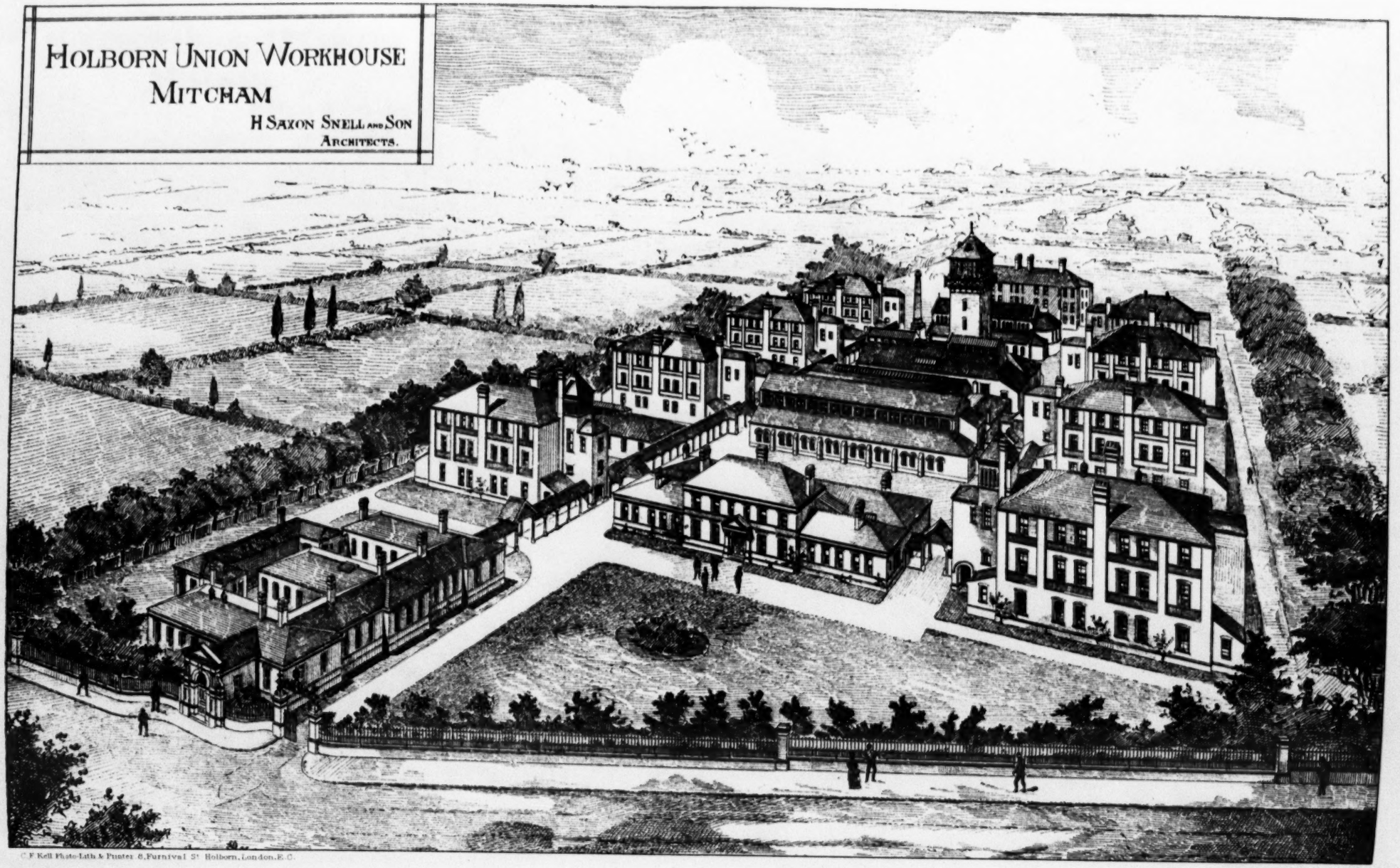
The sketch of a dormer is from the miller's house in Leeds village. The wall plates are carried right through to the barge-board, and supported by shaped brackets with a plaster cove between. There are two of them on the house referred to.

In many of the gardens may be seen one or more yew trees, cut and trimmed into quaint forms; the Malling sketch affords an example. Much more might be said of these simple and instructive buildings, but no description nor any sketch in black and white can tell all the lessons they have to teach or picture half their beauty of colour, which, to be fully realised, must be seen, and, with either Leeds or Ightham for a centre, sufficient interesting material for either pencil or brush will be found near at hand for two or three good long summer days.


Infirmary
Chapel
Water Tower
Clerk
Board Room
Committee Room
Dining Hall
Kitchen
Store
Officers Mess
Matron
Dispensary
Waiting Room
Surgery
Nurse
Bath Room
Scullery
Male Day Room
Male Work Rm
Female Day Room
Female Work Room
Work Shop
Airing Yard
Yard
Mortuary
Porter
OCCUPATION ROAD
MERTON LANE
GENERAL GROUND PLAN
HOLBORN UNION WORKHOUSE
MITCHAM.
H. SAXON SNELL & SON, ARCHITECTS
Scale
First Floor Plan of Infirmary.
First Floor Plan of Male Booked Blocks

HOLBORN UNION WORKHOUSE
MITCHAM

H SAXON SNELL AND SON
ARCHITECTS.



C.F.Kell Photo-Lith & Printer 8,Furnival St Holborn,London.E.C.

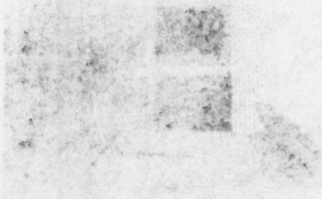
WAITING HALL, GREAT INDIAN PENINSULAR RAILWAY TERMINUS,

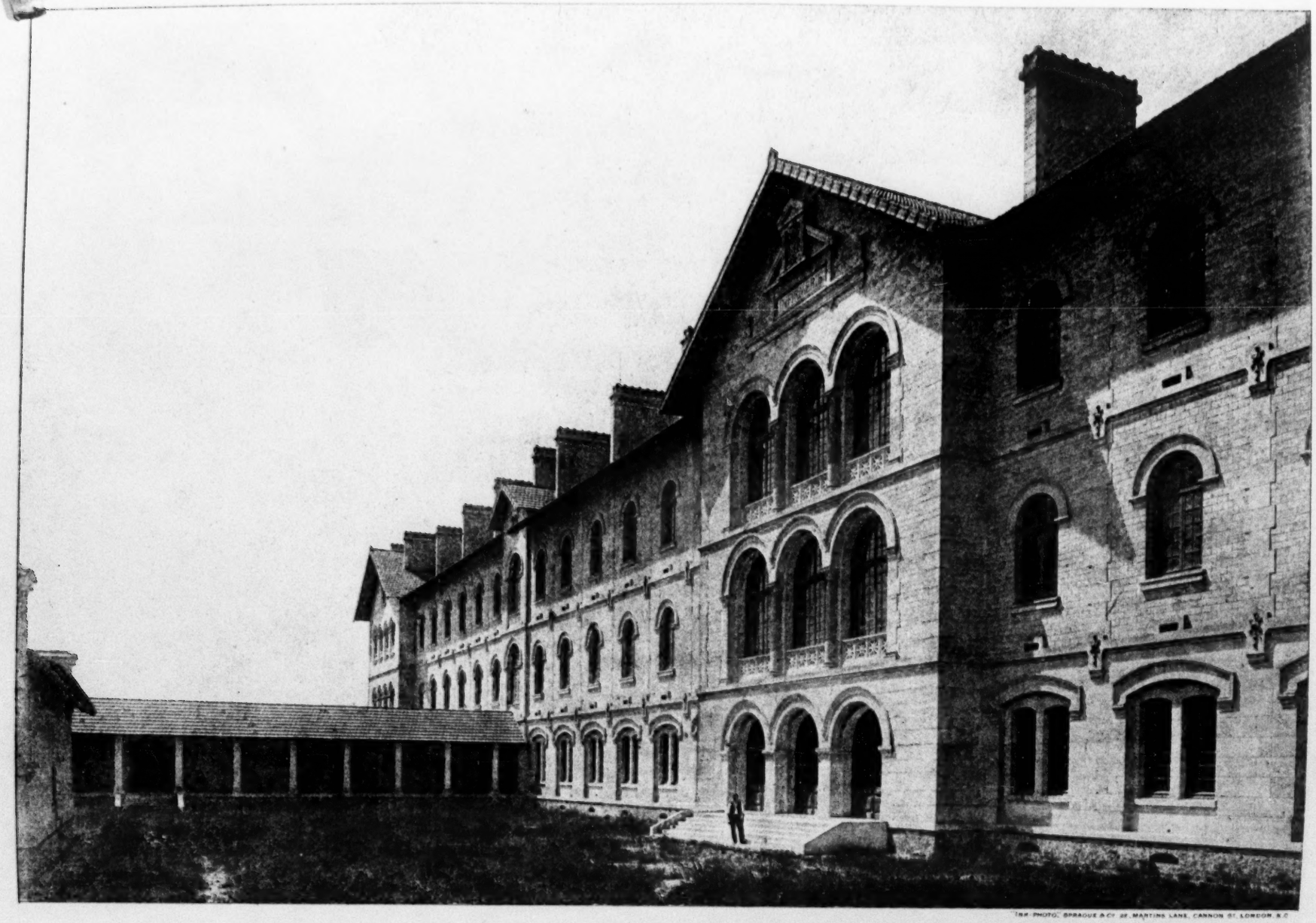
INK PHOTO. SERIAGUE & CO 22 MARTINS LANE CANNON ST LONDON E.C.

RMINUS, BOMBAY.—Mr. F. W. Stevens, F.R.I.B.A., A.M.I.C.E., Architect.

[illegible] PHOTO. SPRAGUE & CO. 62, MARTINS LANE, CANNON ST. LONDON, E.C.

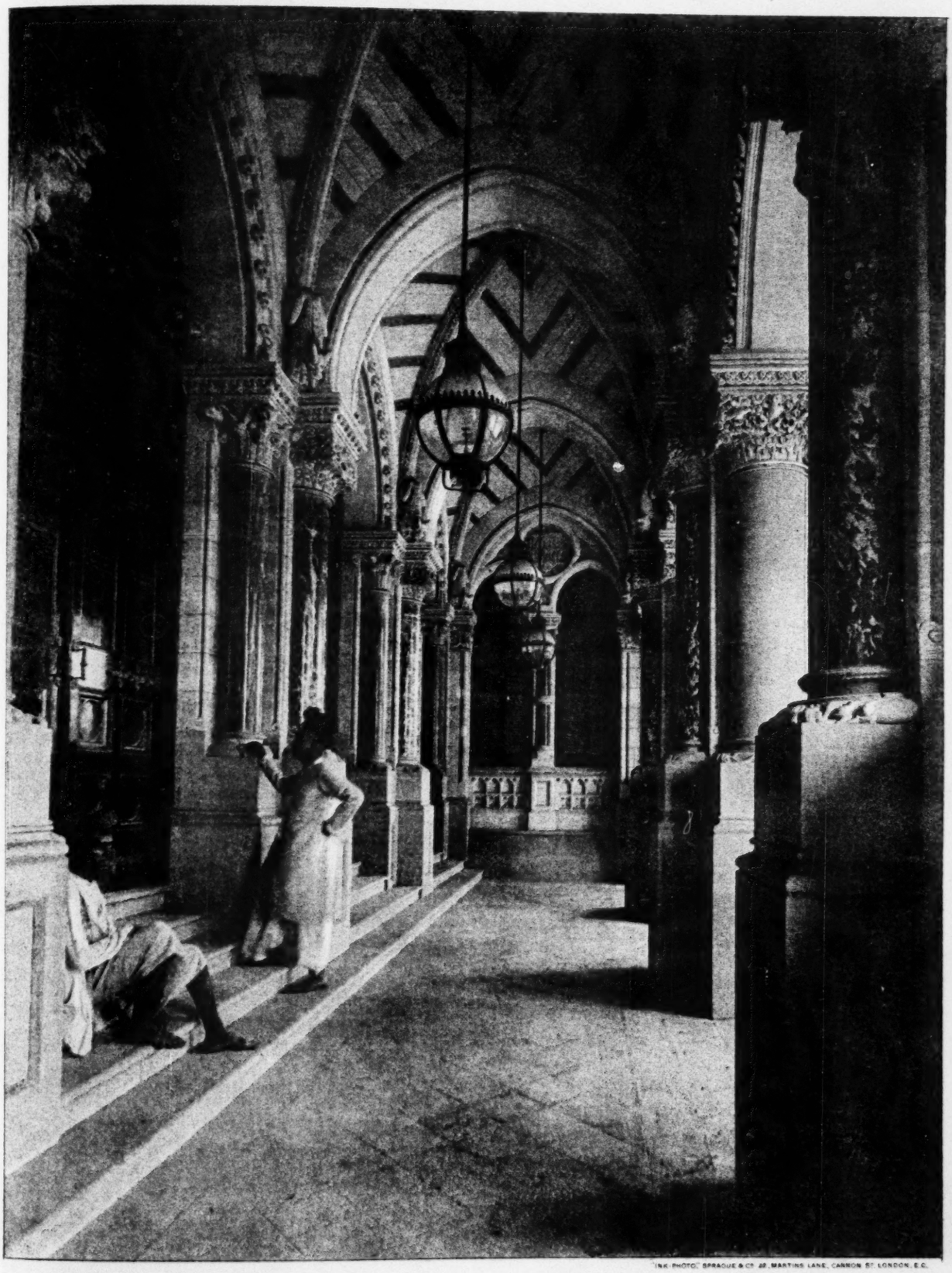
DETAILS OF CARVING, GREAT INDIAN PENINSULAR RAILWAY TERMINUS, BOMBAY.





THE PHOTO. SPRAGUE & Cº 22, MARTINS LANE, CANNON ST. LONDON, E.C.

MAISON DE REPRESSION, NANTERRE. INFIRMARY BUILDING.—M. ACHILLE HERMANT, ARCHITECT.



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ENTRANCE CORRIDOR TO THE WAITING HALL, GREAT INDIAN PENINSULAR RAILWAY TERMINUS, BOMBAY.

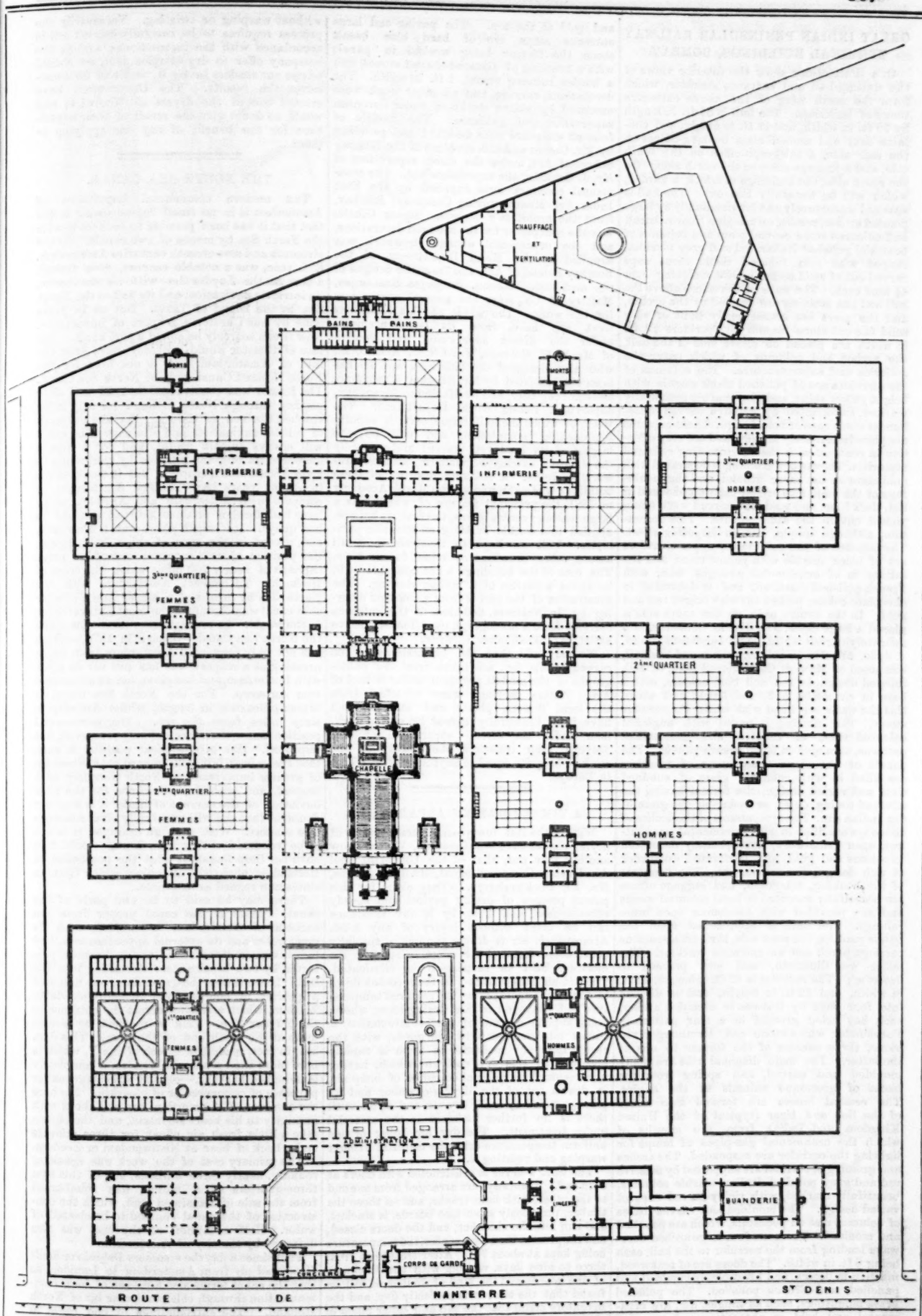
MR F. W. STEVENS, F.R.I.B.A., A.M.I.C.E. ARCHITECT.

"INK-PHOTO," SPRAGUE & Co. 28, MARTINS LANE, CANNON ST. LONDON, E.C.

SCULPTURE AT THE EDINBURGH EXHIBITION. "CLEOPATRA": BY MR. G. A. LAWSON.

C. F. Kell Photo-Lith & Printer 8, Furnival St Holborn, London, E.C.

COTTAGE ARCHITECTURE IN KENT.



Plan of the Maison de Repression, Nanterre.—M. Achille Hermant, Architect.

GREAT INDIAN PENINSULAR RAILWAY TERMINAL BUILDINGS, BOMBAY.

Our illustrations show the interior views of the waiting-hall and entrance corridor, which form the north wing of the above extensive range of buildings. The hall is 82 ft. in length by 76 ft. in width, and 42 ft. in height, and contains first and second class booking-offices on the east side, a telegraph-office on the south side, and a luggage-office on the north side. On the south side, the buildings overlook a garden, which will be tastefully laid out. The hall is spanned transversely and longitudinally by large pointed arches, resting on massive Coorla basalt buff-coloured stone central piers and columns of beautiful polished Italian red and grey marbles, capped with rich foliated Seoni stone caps carved out of solid stones *in situ*, weighing over 4½ tons each. The walls of the offices above the hall and the groining are carried by the arches, and the piers are consequently built of very solid fine cut-stone masonry. Corridors 13 ft. in width are placed on either side of the hall, the arches and columns of which carry the galleries and superstructure. The columns of the corridors are of polished black marble with bright yellow veins, and grey marble beautifully marked, surmounted by massive carved Porebunder stone caps of bold design. These columns are placed alternately in pairs, and are very effective in contrast with the surrrounding coloured materials. The wooden groining is decorated with gold stars on an azure ground, and the mouldings of the main ribs are strongly emphasised in red, dark blue, and gold, the carved work being picked out in the same colours. This decoration, although simple, has an imposing effect. The columns of the galleries or upper corridors are of black marble with yellow veins, and the railing is of ornamental wrought iron, with French-polished handrail, and is decorated in chocolate-colour, picked out with bright red and gold. In the centre arch on the south side is placed a large clock, 3 ft. 6 in. in diameter, in a delicately-carved white Seoni sandstone stand. A dado, 4 ft. 6 in. in height, runs round the hall, composed of Maw & Co.'s glazed tiles, of rich foliated design, in red and buff colours, with a base in chocolate, buff, and black, and above this the walls are lined with white Porebunder stone. The flooring is paved with unglazed coloured tiles, of foliated and geometrical patterns, arranged in large square panels. The panels of the stone tympanums of windows are filled in with coloured glass of subdued tints and varied design, the former having the effect of toning down or reducing the glare of the Indian sun. The tympanums of the arches of doorways are filled in with ornamental wrought-iron open grille-work, appropriately decorated in colours and gold, and perforated woodwork of rich design, for ventilation. The counters of the booking, telegraph, and luggage offices are beautifully executed in local coloured woods and are provided with handsome open brass railings. The hall is approached from the public road, on the west side, through a spacious carriage porch and an entrance corridor. The latter we illustrate, and now proceed to describe :—The corridor is 42 ft. in length, 11 ft. in width, and 22 ft. in height, and is divided into four bays by transverse moulded arches, each bay being groined in a star pattern in Porebunder white stone and Hemnugger red stone, three courses of the former to one of the latter. The main diagonal ribs are richly moulded and carved, and spring from the backs of grotesque animals at the angles. The central bosses are formed into heads of the lion and tiger (typical of the United Kingdom and India) from the mouths of which the ornamental gas-pipes of lamps for lighting the corridor are suspended. The arches and groining of corridor are supported by massive red and grey polished Italian marble columns, beautifully marked, with richly-carved caps of varied design. The moulded and carved bases of columns rest on pedestals, which are panelled and moulded. There are four large arched doorways leading from the corridor to the hall, each being 8 ft. in width. The doors are of teakwood, massive in design, and handsomely moulded and panelled, and French polished. The polished brass mountings, such as hinges, &c., are ornamental and bold in character, and are well executed. The tympanums of arches of doorways are panelled in teakwood, and are filled in with coloured glass of subdued tints and foliated design at the bottom, and ornamental open wrought-iron grille-work decorated in colours and gold at the top. The paving and large entrance steps are of hard blue basalt stone, the former being worked in panels with a hearting of diamond-shaped stones, and a border running round, 1 ft. in width. The decorations, carving, and all other work were executed by native workmen under European supervision and guidance. The models of foliated sculpture were designed and provided by Mr. Gomez and the students of the Bombay School of Art, under the direct supervision of Mr. J. Griffiths, the superintendent. The ornamental counters were supplied by the East India Art Manufacturing Company, Bombay, from the architect's designs. Signor Gibello was the contractor for the coloured decorations, and the ornamental wrought ironwork was supplied by the Metal Department of the Bombay School of Art, also from the designs of the architect. Messrs. Burjorjee Rustomjee, Maistry, & Co., were the general contractors for the work. The whole of this important work has been, from its commencement, under the direct supervision and control of Mr. F. W. Stevens, F.R.I.B.A., A.M.I.C.E., who also designed the buildings, and he has been ably assisted by Mr. Siteram Khanderao, assistant engineer, and Mr. Mahderao Janardhan, supervisor, Public Works Department. The work, of which the hall forms part, is rapidly approaching completion, and will be the largest of its kind yet erected and certainly the most extensive modern architectural work in India. A coloured drawing of these buildings was exhibited at the Royal Academy in 1881, the principal feature of which was a large masonry central dome, the first, we believe, applied to a Gothic building on scientific principles. This we hope to illustrate in detail among other drawings at some future time. The cost of the buildings when completed will be about a quarter of a million sterling. The illustration of the hall is from a coloured drawing by Mr. Nattress, and that of the entrance corridor from a photograph by a Bombay native artist, Mr. Shushunker Narayan.

We may add that the illustrations of the carved details, &c., are taken from the photographs of the models prepared at the School of Art. These carvings were modelled from the local flowers, plants, and animals, and have been beautifully carved by native workmen under the direct supervision of Mr. Stevens, who considers the quality of the work to be quite equal to anything of the kind in Europe.

A TIMBER-DRYING APPARATUS.

Within the last few years several systems of drying timber have been invented. We have now another new one, that of the Universal Cool Air Drying Company (agent, Mr. Paul Ewens, No. 20, Bucklersbury). They claim for this patent process of drying perfect and speedy effectiveness, and that by it any substance can be dried without injury of any kind. Atmospheric air is drawn through a specially constructed furnace, the effect being that the moisture held in suspension is eliminated. The hot-air thus obtained is then cooled down in a special apparatus to the required temperature and conveyed to the drying-room, where, being kept in a state of perfect circulation, it comes into contact with the goods, with the result that any moisture in them is rapidly absorbed by this dry, cool air, which, having now resumed its original condition of damp air, is drawn out of the drying-chamber and its place supplied by fresh dry air and so on until there is no further moisture in the material under treatment. The dry air being of one uniform temperature dries the material without warping and twisting it.

The timber-dryer is constructed with doors at each end. Tramways are arranged from one end to the other, with light trucks, and on these the timber, previously sawn into boards, is stacked, and run into the chamber, and the doors closed, and the process then commences, the temperature being kept at about 75°. After treatment from three to nine days, varying with the thickness of the boards and the kind of timber, it will be found that the timber is perfectly dry, and the inventors claim that the sap and other fluids in the pores and cells are solidified, and that it has not that affinity for moisture which is marked in the case of ordinary stored timber. Fir timber that had been in the canal for three years was reduced from 13 cwt. to 8 cwt., and hard woods lost one-fourth of their weights, in each case without warping or twisting. Necessarily the process requires to be carefully carried out in accordance with the instructions; and as the company offer to dry samples sent, we should advise our readers to try it, and test for themselves the results. The Government have erected one of the dryers at Woolwich, and would no doubt give the result of their experience for the benefit of any one applying to them.

THE NORTH SEA CANAL.

The modern commercial importance of Amsterdam is in no small degree owing to the fact that it has been possible to connect it with the North Sea by means of two canals. In the sixteenth and seventeenth centuries Amsterdam, it is true, was a notable seaport, even though a port on the Zuyder Zee, with its sandbanks, its intricate navigation, and its exit to the North Sea by the island of Texel. But so in years gone by was Chester a seaport of importance. Now it can scarcely be called a port at all. The fate of Chester would probably have been the fate of Amsterdam, had it not been for the North Holland Canal and the North Sea Canal. The former was constructed in 1825, and after passing through North Holland for fifty miles reached the sea at Helder. For the purposes of inland navigation and drainage this canal will always remain useful, and for a time it answered its original purpose by continuing to keep Amsterdam a seaport; but it would never in recent years have enabled Amsterdam to compete with Rotterdam and Antwerp, or to have had foreign produce shipped straight to her quays. Its length alone was a drawback, and, except in the case of ships from Russia, the position of the entrance caused an extra carriage of nearly 100 miles along the coast of Holland. To connect Amsterdam with the North Sea by means of a larger and a shorter ship canal was therefore the most natural thing in the world. In consequence, there now exists the North Sea Canal,—opened in 1876,—which has not only prevented Amsterdam from degenerating as a seaport, but has put her on a par with Rotterdam, and has given her an advantage over Antwerp. For the North Sea Canal is fifteen miles only in length, whilst Antwerp is sixty miles from the sea. Her commercial position is now, therefore, not only preserved, but improved. Her geographical position is such that she cannot fail from year to year to become of greater importance to North Germany as a seaport, and with due allowance for the slow deviation of the current of trade, it is scarcely doubtful that she will eventually rival Antwerp as a seaport. With such an example, it is not to be wondered at that Manchester would fain have her Ship Canal, or that the possession of Holland is obviously an object which German statesmen regard as desirable.

There may be said to be two parts of the canal. There is the canal proper from the harbour of Amsterdam to Imuiden, with its great gates and its external appurtenances, two lighthouses, a tidal basin, and a harbour protected by two breakwaters stretching into the sea. There is also the great dam, one mile and a quarter in length, from Schellingwoude to Zeedam, which stretches across the entrance to the Zuyder Zee. This is reached by several locks at the north end of the dam. This dam has, in fact, made the mouth of the Y, which is here more than a mile in breadth, a completely land-locked harbour,—equally advantageous for purposes of commerce or of pleasure. For here the amateur of Amsterdam can sail about with impunity to his heart's content, and the citizen take a little fresh air afloat for three stievers and a bock of beer at Nieuwendam or Zeedam.

The primary cost of the work was, speaking roundly, nearly three millions, but of this sum three-quarters of a million was reimbursed from the sale of reclaimed land, which the construction of the canal enabled to be cleared of water. Half a million of the cost was also defrayed by the city of Amsterdam.

Four times a day the steamers *Dolphin* or *Stadt Pumerend* ply from Amsterdam to Imuiden, so that the canal forms also a means of local communication through this particular bit of North Holland. The surroundings of one canal in Holland are very much like those of another,—the same windmills rushing round, the same fat cattle sleepily grazing on grassy meadows, and neat red-roofed houses with green doors and windows. But in one sense the North Sea Canal is the most characteristic piece of

The North Sea Canal.

Holland. It focusses from time to time the entire national characteristics of the country in a single glance; for the nearest object to the passing steamer may be a great barque just arrived from the East being laboriously towed to her berth at Amsterdam: she nearly touches the bank of the canal just where a windmill is propelled by the fresh north wind, and a small pumping-house keeps the low-lying polders free from water. On these, as far as can be seen, speckled cattle are dotted in groups, and in odd corners of the fields husbandmen are steadily at work. In the distance the spire of Beverwyk or the red roofs of Zaandam easily catch the eye. When the sun shines, and the wind blows refreshingly, Imuiden is attractive enough. It is a rendezvous of sailors and fishermen in quaint costumes. Among them are mingled sober-looking peasants watching the working of the locks, the women with large gold lappets and earrings projecting on to the face. A few years ago Imuiden was simply a spot in the great sandhills which stretch along this coast. Now it is sprinkled with houses scattered about these barren sand-heaps, and in a few years these will become a populous place, with *cafés* and *restaurants* looking on to the sea.

THE CARPENTERS' COMPANY AND TECHNICAL EDUCATION.

The Carpenters' Company, as our readers know, has done much of late years to advance the cause of technical education, especially in relation to the building trades; and now we have to mention a new and most laudable effort on the part of the Company. The Company are the owners of a large and rapidly-developing estate at the East End, in the midst of a busy and industrial centre at Stratford, a little to the westward of the Great Eastern Railway Station. Upwards of 500 houses have already been built and inhabited, the estimated population on the estate being nearly 5,000. To meet the wants of the residents on this estate and the surrounding neighbourhood, and to promote the spread of technical knowledge, the company have just built a Workmen's Institute and Lecture-hall in Jupp-road, leading out of Lett-road, and this building was formally opened on Tuesday, when, on the invitation of the Master and Wardens of the Company, some fifty or sixty gentlemen connected with the Company, or with local industries and educational work, visited the estate. The visitors included Mr. R. W. Kennard (Master of the Company), Mr. Alderman William Lawrence, Mr. W. Willmer Pocock, Mr. Alfred Preston, Mr. Stanton W. Preston (Clerk to the Company), Professor T. Roger Smith, Mr. Wilfrid Nicholson, Mr. W. Ritchie, Mr. A. Boake, Rev. Mr. Sant, Rev. G. Towner, Mr. H. J. Cook (vice-chairman of the West Ham School Board), and other gentlemen connected with the locality. The buildings (which have been erected by Mr. William Gregar from plans by Mr. T. Roger Smith, the Surveyor to the Company) include a lecture and recreation-hall capable of seating about 300 persons, a commodious cookery class-room in the rear, and a detached iron building for use as a workshop. Mr. Alfred Preston, in the course of an interesting statement, said that the Carpenters' Company, recognising that property had its duties as well as its rights, and recognising the value and importance of facilities for technical education and wholesale recreation, had put up these buildings, and, furthermore, a large piece of ground to the westward of them would be preserved as an open space or recreation-ground, possibly to be provided with a gymnasium. In the lecture-hall various educational and recreative lectures and entertainments would be given. In the evening there would be technical classes, illustrated with workshop operations, in carpentry, plumbing work, sheet metal work, and other subjects, besides classes for such subjects as mechanical drawing. The instruction in these subjects was to be of the same character as that given in the City Guilds' Technical Institute and at the classes at the Polytechnic Institution. Lectures would also be given from time to time, and the first two lectures would be by well-known architects, Mr. Thomas Blashill and Mr. John Slater. While these advantages were being offered to the lads and young men, the girls and young women were to be taught cooking in the room allotted for that purpose. It was proposed that the new Carpenters' Institute should be managed by a committee composed partly of members of the Court of the Carpenters' Company, partly of local employers of labour and other gentlemen of influence, and partly of workmen themselves. The instruction to be given would not be gratuitous, but the fees would be so low as to place the opportunities of self-improvement within the reach of the poorest lad or young man who desired to avail himself of them. Other addresses were also delivered, the speakers including the Rev. Mr. Sant, who described work of a somewhat similar nature which had been carried on at the Church Hall, West Ham; the Rev. George Towner, Baptist Minister, who was thanked by the Master for the great assistance which he had rendered to the Company in this local effort; Mr. Alderman Lawrence; and Mr. W. Willmer Pocock.

THE EMPEROR OF RUSSIA'S NEW CASTLE AT SPALA.

During the last few weeks the Russian press have been teeming with accounts of the new castle which the Emperor has been building at Spala, in Poland, and which is now completed.

The Castle of Spala stands in an exceedingly pretty position, on the banks of the little river Pilitza, and is modern in style. The principal parts are built of red granite and sandstone,—the building itself being of brick. There is very little ornamentation, and the roof is an ordinary tiled sloping one. Through the principal entrance, which is in the form of a porch with a lofty arched roof, the great hall is entered, whence splendidly-carved oak doors lead to the dining-room, which, with a few retiring-rooms, occupy the ground floor. The former is a beautiful room in Renaissance, 40 ft. long, 24 ft. wide, and 16 ft. high, lighted by six pointed windows.

From the hall a broad sandstone staircase, covered with thick red carpets, leads to the first floor, the middle and left parts of which contain the rooms of the Emperor, those of the Empress being on the right. On this floor are, besides, eight rooms for the accommodation of the Cesarewitch and his *suite*. The cabinet of the Emperor is remarkable by its plain but solid elegance. Between the two windows stands a large heavy writing-table of oak, and against the wall, right opposite, a marble chess-table, beautifully designed. The window-curtains and *portières*, as well as the carpets, are of heavy rich brown damask, and the furniture covered with brown leather. Adjoining the cabinet are the Emperor's bed, bath, and dressing rooms, which are mostly furnished in marble and oak. The bath is of real China, with an oak frame.

The saloon and boudoir of the Empress are furnished in walnut covered with dark purple velvet, into which various lighter designs have been woven. The frames around the mirrors and paintings are also covered with dark purple velvet, a substance to which the Empress is very partial, whilst a splendid Turkish carpet covers the floor. Here stands also the grand piano used by her majesty. On the walls are a number of oil-paintings, representing certain Imperial hunting incidents and a number of water-colour drawings by the celebrated Russian court painter, Zichy, illustrating the Meeting of the Three Emperors at Skiernevice. Some are of a humorous nature, as, for instance, one representing the three Imperial chancellors in animated conversation in the foreground, and the correspondents of the leading European organs rocking on telegraph-wires in the background. A broad covered balcony, decorated with plants and flowers, runs outside the saloon along the northern façade.

Along the roof of the castle large water-tanks have been placed, whence the rooms are supplied with hot or cold water. The rooms on the third floor are used as bedrooms for the attendants, and are reached by a special staircase. The kitchen is situated in a separate building, and communicates with the room in which the dishes are dressed, next to the dining-room, by a covered passage. Close by the kitchen are the stables, with room for fifty horses, the carriage and harness rooms, &c. A paved roadway, 60 ft. in length, leads to the park, which has an area of about 100 acres, the whole being enclosed with wire netting. All the roads and paths in the park are covered with thick moss. During the Imperial hunts in the neighbouring forests some 1,500 huntsmen rangers and drivers are employed.

The castle has been designed and all arrangements connected with it carried out by Count Wielopolsky, a Polish nobleman distinguished for his artistic taste, to whom the Emperor left everything. The first stone was laid in April, 1885, the whole building, &c., having thus been completed in eighteen months. It should, however, be mentioned that the Count had *carte blanche* as to money and workmen, but not to time, the Emperor having stipulated that the castle should be ready this autumn, in time for the hunting season.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.

At the opening sessional meeting of this Society on Monday last, the President, Mr. C. R. Chorley, delivered the inaugural address, from which we give the following extracts:—

In meeting together for the inauguration of another winter's meetings, it becomes my pleasing duty to congratulate the members of this Society on the uniform success which has attended the work of the Leeds and Yorkshire Architectural Society during the past year. The section which embraces the younger members has maintained the enterprise and activity to which my predecessor alluded in his presidential address of twelve months ago. The sketching club has worked assiduously, with results that have afforded as much pleasure to those whose multifarious duties have almost extinguished the opportunities for pursuing the fascinating art of sketching, as it must have afforded permanent benefit to the members of the club who have so well exercised their pencils during the summer.

The Associates of our Society will not, I am sure, misunderstand the tenor of my remarks, or imagine that I am decrying the value of sketching, when I venture to warn them against devoting too much attention to this enjoyable department of their work, to the detriment of the more solid and less pleasurable portion of an architect's acquirements. It is possible to be an efficient architect, even to be an artistic architect, without being a skilled sketcher, yet no one can be a finished architect, having the confidence of his clients, or confidence in himself, without possessing the fundamental professional need of business capacity, and a thorough knowledge of scientific and sanitary building requirements.

The architectural student can no longer plead ignorance of the curriculum to be followed in preparing for his future calling in life. That has now been carefully laid down by the Royal

Institute of British Architects, in the pamphlet issued for the guidance of those preparing themselves for the Examination for the Associateship of that body; and it cannot be too often or strongly impressed upon the coming race of architects that in the near future no one can hope to be held in esteem by the public, or consider himself qualified for the pursuit of the profession of architecture, who has not, by successfully passing the examination alluded to, qualified himself for admission into the circle of the Institute.

The general work of the Society has shown uniform if uneventful progress during the year. The most significant mark of this is seen in the necessity which has arisen for our removal to larger premises. To our members and friends I offer a cordial welcome to our new home, and trust that the steady progress which has characterised our Society from the commencement may attend it in the future, and justify the enterprise of the committee in providing enlarged facilities for carrying on the work it has in view.

Financially, the Society is in a sounder condition than it has ever before been in, and though our expenses have grown considerably, our income has increased in a slightly better ratio, so that we have been able to almost extinguish the liabilities which the activity of the past has laid upon us, and to remove the anxiety which is a necessary accompaniment of a condition of insolvency.

As I before remarked, the most impressive proof of our continued progression is to be found in to-night's inauguration of our new premises, as it shows how we have successively out-grown the different places which have previously accommodated us. I am sanguine enough to believe that we have not yet reached finality in our professional home, but that eventually architecture in Leeds will come to have a permanent centre in buildings erected and owned by this Society. It is in this direction we ought to stedfastly keep our attention, and, though such a prospect for the moment seems visionary and too ambitious, I have confidence that in good time it will be realised.

To aim high is the only way to attain much, and we shall fail in our mission if we ever allow ourselves to feel perfectly satisfied in our present position. Above all, we must never cease to remember the pre-eminent importance of collective action, and the pressing need for setting aside individual advantages for the general good.

No profession has suffered so severely or lost so much in material profit as our own, for want of organisation. Until recent years each competent member of the general body has pursued his way, unconcerned by any regard for the general welfare, and careless of anything further than the immediate present.

We can hardly complain because this selfish isolation has permitted our profession to be robbed of many branches of honourable and lucrative employment, and has allowed the estimation in which it is held to be lowered in the sight of the outside public.

That there is a marked and welcome improvement in this respect is owing wholly to the establishment of, and activity in, societies like our own; but it will never become all that we are entitled to expect until every architect belongs, and is loyal to, the local and central organisation.

There are still,—in many towns more than our own,—respectable fellow-professionals who are unattached to any Society. There are others who, whilst belonging to our own or other bodies, give but a lukewarm and half-hearted support to the collective interests. Such men are traitors to the art of architecture, and selfish robbers of the birthrights of their children who succeed them, or the rising generation who have their work to take up and carry on. If even they are deaf to the rights of others they are blind too to their own interests, which are bound up, more or less, with the common good.

The special province of our Society is to guard the interests of the art of architecture, not for our own good when that may be attained against the general benefit, but for the purpose of preventing injury being done to that art by ignorance or carelessness, and of raising by all legitimate means the estimation in which it may be held by the public. To do this is indirectly the surest way of improving the tone of our profession, and of ensuring to it the respect and deference which should be paid to all professions, when moving in questions affecting the particular province of each.

The attention of our members has recently been again called to the ever-recurring question of competitions, by the erratic and aimless movements of the Corporation Committee who have in charge the arrangements for the erection of an Art Gallery for Leeds. Not the least peculiar of the resolutions arrived at by this body has been one rejecting somewhat brusquely the advice of this Society regarding the sum to be expended on the erection of the new building. The opinion of nearly all the leading architects of Leeds, men of all others the most competent to form a sound judgment on a question of the cost of building operations, was entitled to influence the decision of the Art Gallery committee, however well and wisely they might consider themselves to be advised. That opinion ought to have been doubly binding on them, because we know that the most experienced of their professional advisers held views in this matter coinciding with our own. How absurdly ridiculous the amount fixed for the erection of the Art Galleries is, in comparison with the work to be done, any rational and honest architect will admit, when he hears that the rate per cubic foot which the Leeds Art Galleries Committee consider sufficient to erect public buildings hardly exceeds 3d. This, too, to include fireproof floors and all the special arrangements for lighting, ventilating, heating, &c., which the future presence of valuable contents demands.

With care and economy a cottage house of the poorest character might be erected at this rate, but I defy the committee or their advisers whom they quote to name one single public building of the same class, which is not a temporary erection, anywhere in the United Kingdom, that has been completed for anything, even approximately, near the sum they have named, and which, in the face of our correction of their error, they insist upon as being sufficient for the completion of public art galleries worthy of the Borough of Leeds.

There was, too, no room for ingenuity to curtail the area of the buildings. The conditions of competition laid down clearly the ground to be covered, and fixed the height of the rooms, so that any reduction of cost could only be realised by resorting to all the expedients of jerry building, which it is supposed to be the special province of town councils to suppress.

It is usual for the annual address of this society to make mention of such buildings of note as have risen in our streets during the past year. I regret that the long-continued depression in the building trade obliges me to dismiss this portion of my duty in very brief manner.

This month sees the completion of All Hallows' Church, from the designs of Messrs. Kelly & Birchall. The reputation of the firm will lose nothing from an inspection of this most recent of their productions.

The only other building of moment in progress is the new offices for the *Yorkshire Post*, which are slowly rising, from the designs of the firm to which I belong. It would hardly have found a place in my address had it not been that it is worthy of study as an excellent illustration of the advantages and disadvantages of the use of terra-cotta.

It is an unquestionable gain to street architecture and to the cheerfulness of towns that we have at our disposal an imperishable material, which will always preserve its bright colouring amidst the gloom of a darkened atmosphere. There is no doubt that, as yet, these welcome advantages can only be obtained by the exercise of a seldom-found patience on the part of our clients. The difficulties incidental to the manufacture of this material of excellent quality, appear to set a bar to anything approaching to rapidity of building when it is made use of. The original difficulty in obtaining regular lines has been largely overcome, or, at least, to so great an extent as to no longer make this objection to terra-cotta in any measure a serious one. So soon as the greater rapidity of delivery can be counted on it will grow rapidly in popular favour and become the recognised facing material of town buildings.

Leaving matters of local and personal interest for those affecting the general well-being of the whole profession, the most notable incident of the past year has been the completion of the new Charter of the Royal Institute of British Architects, so far, at least, as the labours of the Institute itself are concerned. This document, possessing so much interest and importance to architects, is now before her Majesty's Privy Council, and so soon as their and the Queen's assent is given to it, we may hope to find the Council and the members of the Institute assiduously engaged in the preparation of the by-laws which will be essential before the possibilities enclosed within the Charter become of practical value.

It cannot be alleged, even by Professor Kerr, that this document has been hastily prepared, or that its provisions have not received the most thorough investigation on the part of the members of the Institute. The process of evolution which it has undergone has been singularly and tediously slow, and we can only hope that the final result will be commensurably perfect.

There can be no doubt that when it becomes the guide to the actions of the Institute, that body will commence a new era of usefulness and influence. Its members will have far more power than has been the case heretofore, and its actions will, in an immeasurably larger degree, be those which have the sanction and support of the general body of architects.

The watchful attitude which this Society has maintained during the settlement of the terms of the Charter, must not be relaxed until the preparation of the new By-laws is at an end. Upon the wording of these will wholly depend the successful working of the Charter, and the influence of provincial members over the actions of the Institute will depend so largely upon the way in which they are framed, that it will be more than ever important that every clause should be minutely examined by us and other societies before it is allowed to come before the Privy Council.

It is of special importance that the power of voting by papers should be granted by the by-laws; for in no other way can the influence of provincial members be made felt in the guidance of the future decisions of the Institute. The opinions of the metropolitan and provincial Fellows are so frequently at variance, that we can no longer afford to have our views overridden by the mere incident of living further from Conduit-street than others do.

Another subject for just congratulation is the increased tendency which the promoters of public architectural competitions show in favour of the appointment of professional assessors to assist in the decision of these contests. That this movement is largely the outcome of the great spirit of cohesion which architects now exhibit is unquestionable. The idea would hardly suggest itself spontaneously to public bodies that greater wisdom on special matters might be found outside themselves; yet these bodies would not yield on such a point even to outside pressure, if there did not exist amongst them a higher sense of honour than formerly prevailed, or if they were not actuated by a keener desire to do full justice to those whom they invite to take part in architectural competitions.

We may rejoice in both changes. That a higher tone of morality prevails in public life is to the gain of all. That a keener perception of the necessity for brotherly union amongst ourselves is dominant, is a matter not only of personal material advantage to each, but will serve inevitably to raise the whole architectural profession in the esteem of the public, as well as to improve the general tone and strengthen the *esprit de corps* of the profession itself.

Sanitary Assurance Association.—At the monthly meeting of the Council of the Sanitary Assurance Association, held last week, Mr. Andrew Stirling in the chair, a communication was received from Dr. R. Farquharson, M.P., in reply to the request of the Council that he would again take charge of the Sanitary Registration of Buildings Bill. Dr. Farquharson consented to the request, and will bring in the Bill again, in connexion with the Members for South Manchester, Central Hackney, and Glasgow; and the following resolution was unanimously passed:—"That the thanks of the Council be given to Dr. R. Farquharson, M.P., for having undertaken to re-introduce the Sanitary Registration of Buildings Bill next Session; also to Sir Henry E. Roscoe, M.P., F.R.S.; Sir W. Gwyer Hunter, M.P., M.D., and Dr. Charles Cameron, M.P., for consenting to again back the Bill."

NEW SEWAGE WORKS AT BOLTON.

The new outfall sewage works for Bolton were opened on Monday last. They are situated at Hacken, on the River Croal, and have cost about 30,000*l.* Mr. J. Proctor, M. Inst. C.E., is the engineer. They are capable of treating upwards of four million gallons of sewage daily. The site contains 21¾ acres. Mr. Proctor has forwarded to us a pamphlet describing the works and those at Burnden. He says:—

"Topographically, the borough has three water-sheds, namely, the Croal, which embraces the heart of the borough to the extent of 1,627 acres, and the townships of Heaton, Rumworth, and Lostock; the Tonge, including the eastern and northern portions of the borough, having an area of 358 acres, and the townships of Darcy Lever, Breightmet, Tonge, Sharples, and Halliwell; and Jenny Beck, which includes 193 acres of the southern portion of the borough and portions of the townships of Great Lever, Middle Hulton, and Over Hulton. Intercepting sewers of sufficient capacity to meet the requirements of these water-sheds have been laid by the Corporation along the valley lines within the borough, and as close to the rivers and streams as practicable.

The Croal intercepting sewer discharges at the Burnden Sewage Works from an oviform sewer of 4 ft. by 2 ft. 8 in., and is reduced as required along the route to a section of 2 ft. diameter at the borough boundary, Blackshaw-lane, with a total length of 3,700 yards. The Rural Sanitary Authority have continued this sewer to Deane Clough and Rumworth, and contemplate extending it through the townships of Heaton and Lostock.

The Tonge Intercepting Sewer forms a junction with the main outfall sewer, a little below the confluence of the River Tonge with the River Croal, near Hacken-lane, in Darcy Lever, and traverses the Tonge Valley and Astley Brook, to the north end of Raglan-street, Halliwell. Its diameter decreases from 24 in. at the outlet to 12 in. at the commencement, having a total length of 5,530 yards.

The Jenny Beck Intercepting Sewer discharges into the main outfall sewer near Burnden Bleach Works, and follows the valley line to Adelaide-street, thence along that street and St. Helen's-road to the Railway Crossing, at which point a connexion will be made with the sewers of the Rural Sanitary Authority now laid in the townships of Over and Middle Hulton. The total length of sewer laid by the corporation is 3,900 yards.

The main outfall sewer runs along the valley of the Croal from the Hacken Outfall Works to the Burnden Works, at which point it joins the catch-pit of the Croal sewer, and receives in its course the sewage from the Tonge and Jenny Beck sewers. Its section at the point of outlet is 6 ft. by 4 ft., and the discharging power is equal to 50 million gallons per day of twenty-four hours, or of more than sufficient capacity for a population three times the number requiring to be accommodated at present upon the water-shed within the environment of the scheme.

The Burnden Works were constructed in the year 1870, for the purpose of dealing with the sewage from the Croal intercepting sewer, then laid between Burnden and Great Bridge, Chorley-street. They are situate on the west bank of the Croal, near Rosehill, and consist of six tanks, averaging 5 ft. 6 in. deep, with a total capacity of 400,000 gallons. The buildings consist of one block, 100 ft. by 60 ft., cellared throughout, boiler-house, and other sheds, with a chimney-shaft 150 ft. high. These buildings were originally designed under the advice of the ABC Company for the reception of drying floors, upon which the mud from the tanks was dried, partly by the exhaust steam and partly by the gases from the boiler fire. This was discontinued, as the dried mud fell in value from 5*l.* to 5*s.*, after which the arrangements with the ABC Company were brought to an early termination.

In consequence of the buildings and machinery then existing at these works, it was decided to utilise them for the preparation and application of lime or other precipitant for the new works at the Hacken, instead of duplicating the machinery at that place, involving a large outlay upon capital account, in addition to a heavy fixed charge for a second staff of workmen. Such alterations to the machinery and mixing pits as were deemed necessary have been made, a new catch-pit, 20 ft. long and 10 ft. wide, has been constructed, with the requisite breakwater, sluice, gauge, screen, and other apparatus, by means of which the flow of sewage to both Burnden and Hacken can be computed, as the depth flowing over the gauge may be seen at once upon the graduated plate affixed to the side of the pit.

The Hacken works are situate partly in the township of Darcy Lever and partly in the township of Great Lever, and are bounded on the north and east sides by Fogg's-lane, on the south by the river Croal, and on the west by a new street, 12 yards wide, leading from Hacken-lane over the new bridge to Smith-road.

As previously stated, the precipitating medium, whether milk or lime, animal carbon, or sulphate of alumina, is added to the sewage at the Burnden Works, and is thoroughly mixed and blended together whilst passing down the main outfall sewer, a mile in length. On its arrival at the outlet or junction with the storm sewer it passes through two penstocks to the catch-pit, where gravel and other heavy matter are retained; thence through the screen to the gauge basin, over the gauge, through either of the conduits as desired to one of the detritus-tanks, where all solids heavier than flocculent matter are deposited; when this tank is full, the sewage which has left behind the majority of suspended matter flows through the outlets into a conduit alongside, having a bellmouth connexion with a system of iron pipes communicating with settling-tanks, each controlled by a valve; these pipes run beneath and through the centre of each tank, and communicate with the surface of the tank floor by means of three large gratings, up and through which the sewage flows until the tank is full; after a period of rest, the effluent is drawn off from the surface by means of six automatic floats through another line of iron pipes into the river, or through the turbine if the detritus or mud tanks require cleansing by the pump. The mud left in the settling-tank then flows into one of the mud tanks, whence it is pumped by means of a centrifugal pump to the adjoining land.

The settling-tanks, three in number, measure 297 ft. long, 96 ft. wide, and 6 ft. deep, and are alike in all respects; the floors are formed and floated with smooth concrete, dished in three sections from the cast-iron central inlets, with channels to the effluent floats; they are filled from the conduit south of the detritus-tanks through 24-in. iron pipes to the first inlet before mentioned, thence through 18-in. pipes to the second and third inlet; when one tank is filled the valve is closed, and a second tank filled; the third one may, in the meantime, be undergoing a process of cleansing. After the full tank has been at rest for a time and final purification completed, the effluent water is drawn off through six automatic floats into iron pipes increasing in diameter from 9 in. to 24 in., passing through the turbine house to the river. These floats are constructed of galvanised sheet iron, the tube is 2 ft. 6 in. by 6 in. at the mouth, and is reduced to a 9-in. pipe at the base, buoyancy being maintained by movable air-tight compartments on each side, thus keeping the mouth submerged a few inches so that the clean effluent flows to the turbine, the float maintaining its level on the surface of the tank as the water rises or falls. Each float is attached to its branch by means of a V-joint with brass facings, supported in the centre and at the ends by a wrought-iron shaft, 2 in. in diameter, bearing upon a cast-iron frame embedded in and surrounded by concrete. After the effluent is run off to within a few inches of the bottom, one of the mud-tank valves is opened, and the sludge flows through the inlets whence it came into 18-in. pipes to the mud-tank, these pipes serving the double purpose of supply from the detritus-tanks and conveyers of sludge to the mud-tanks. The cubical contents of the tank space is equal to about one day's supply of sewage."

Mr. Proctor designed these works when Borough Surveyor, and on resigning that office he was appointed engineer to complete them, having the assistance of Mr. Edward Stanley Bayliss upon the ground the greater portion of the time. Mr. William Longworth, superintendent of the Parks department, has laid out and superintended the planting of the ornamental portion of the work. Mr. John Fish, of Preston, was contractor for the tanks and conduits; Mr. Robinson, of Bolton, built the gate-house and superstructure of the turbine-house; Messrs. Stanton & Co., supplied the iron pipes; Messrs. J. & E. Wood the penstocks, gauge, &c.; the Streets Department paved the roads; Messrs. Stott & Co., of Haslingden, supplied the dredger and screen; Mr. W. Gunther, of Oldham, supplied the turbine and centrifugal pump. The cement was obtained by the Corporation from Mr. Otto Trechmann, of West Hartlepool, and the Clitheroe Cement Co. Mr. Chadwick, of the School Hill Ironworks, supplied the gates and a portion of railing.

ST. GEORGE'S HALL, LIVERPOOL.

Sir,—In the *Builder* of the 16th inst. [p. 548] you remark, with reference to St. George's Hall, Liverpool, that "it is much to be regretted that the present municipal authorities should be so indifferent to the completion of a world-famous building, which seems now to be regarded with more interest anywhere than in the town in which it was erected." It is far worse than this, Sir; and if the municipal authorities would but let it alone the admirers of this magnificent building would have cause to thank them. I recently visited the hall after an interval of several years, and this is what I found in the interior.

1. The rich and carefully-designed central tiled floor is *boarded* over, thus blotting out a beautiful feature, and entirely disturbing the rich effect of colour: more than this, the architectural lines are destroyed, for the tiled floor was two or three steps below a broad margin of floor which runs round the building, but the boarding now carries the eye across flush from side to side. I am told that the alteration has also diverted the ventilation.

2. There is a richly-designed arrangement of architectural features below the organ, and, seen as Cockerell intended it, this instrument, with the supports that carry it, forms a noble termination to the hall. I found all this blotted out of sight by the steps and benches of an ordinary orchestra, and this end of the hall reduced to the bare and beggarly appearance of any ordinary concert-hall when empty.

3. Worst of all, the windows at the two ends of the vault through which the building obtains its chief light, are now filled with painted glass so crude in colour and coarse in design that they ruin the whole effect of the vault. One of these compositions represents a colossal St. George slaying a grogram green dragon, of vast size, who folds and curls through a great part of the picture, filling the field of vision with bright verdigris colour. I can recall no instance of so damaging a treatment of a great building as this, and if you can induce the Liverpool people to have these windows removed you will earn the gratitude of lovers of architecture throughout Europe.

Surely the guardians of such a monument as this ought, like the chapters of our cathedrals, to appoint a consulting architect of high standing, and take his advice on any alteration or addition made to a building which, I believe, is the finest work of its class, not only in England but in Europe. F. R. I. B. A.

*** While agreeing entirely with our correspondent in his criticism as to the architectural effect on the Hall of the additions and alterations he refers to, we must observe that, as to the orchestra and the wooden flooring, the person indirectly, but really, to blame was Elmes himself, who was commissioned to build, not a grand *salle des pas perdus*, but a large concert-room for the triennial festivals then held in Liverpool, and which have since unfortunately dropped. Elmes wilfully ignored all musical and acoustic considerations, designed no orchestra, but a small tribune on which a few singers could stand, and laid a floor sunk in the centre of the area, with the worst possible materials for a music-room,—tiles. No doubt the alterations have quite spoiled the Hall architecturally, but without them it could never have been used for the purpose it was ostensibly built for. The moral is that the architect who is entrusted with an important commission should study to do as well as possible what he is commissioned to do, and not what he himself chooses to prefer.—Ed.

The Victoria Hospital, Burnley, was opened on the 13th inst. by Prince Albert Victor. The building is one of special interest, inasmuch as the wards are circular on plan. We will give a description of it in a future number.

"FEDERATION" CIRCULARS.

SIR,—The Architectural Federation Committee having been asked [by a correspondent], in your columns of last week, to publish the names of the gentlemen composing it, I beg to enclose the following list:—

Architectural Federation Committee.

G. W. Bourne (Edinburgh).
Basil Champneys.
Alfred Emden, Barrister-at-Law.
Walter Emden.
H. R. Gough, F.R.I.B.A., Pres. S.A.
G. G. Hoskins, F.R.I.B.A. (Darlington).
J. J. Lish, Vice-Pres. S.A. (Newcastle-on-Tyne).
W. H. Lynn (Belfast).
G. A. T. Middleton, A.R.I.B.A., M.S.A.
F. B. Osborn, F.R.I.B.A. (Birmingham).
Arthur Pollard (York).
C. H. Robertson, Solicitor.
W. H. Seth-Smith, Vice-Pres. S.A.
Robert Walker, A.M.I.C.E., M.S.A. (Cork).
William Young (London and Glasgow).

EDGAR FARMAN.

No. 39, King-street, Cheapside, E.C.
October 21st, 1886.

INTERPRETATION OF BY-LAWS.

SIR,—We have in Chiswick what are known as "model by-laws." Among the clauses are two relating to,—1st, chimney-backs; and 2nd, flue withes. The first reads as follows:—"Such person shall cause the back of every other chimney opening in such building from the hearth up to the height of 12 in. above such opening, to be 9 in. if such opening be elsewhere than in an external wall." Now this is arbitrarily made to read that where two fireplaces are back to back, the total thickness of the wall is 18 in., *i.e.*, 9 in. for each back. The second reads as follows:—"That every smoke-flue shall be carried up in brickwork all round at least 4½ in. thick." This is read as that where two flues are together, they shall have a 9 in. withe between. You can imagine what a stack of ten flues would look like with 9 in. partitions *each way*. Putting aside the projection into the rooms (especially of small property) caused by extra thickness of back, and the huge size of chimney stack, and also the question of cost, I wish to ask the following questions:—

1. How do other surveyors, working under the same or similar by-laws, read these clauses?

2. Would fire-insurance surveyors care a rap for presumed extra protection from fire? Would they not rather have the 9 in. round the flue?

3. I ask architects and surveyors generally whether the above reading is not against all known practice? And if, in a case of a public building where they were not limited to cost if they would adopt these precautions?

There are other severe by-laws relating to parapet walls which press on us most heavily.

A CHISWICK BUILDER.

THE DIMINISHING REMAINS OF ROMAN BATH.

SIR,—The Roman antiquities of Bath were visited last year by no fewer than 60,000 persons. The circular bath and all now contended for were not then visible. The public interest in these relics cannot be doubted. Notwithstanding this, Mr. C. E. Davis, in his Report, dated May 3rd, 1886 (submitted first to the Baths Committee, and afterwards to the Town Council), ridicules those who "revel in stones of the past and study the habits and manners of long-forgotten Bath" (Cf. p. 3). Such an expression, uttered by a professed antiquary, carries its own condemnation. At the same time it reveals the secret of the destruction so earnestly protested against.

It is strongly felt by an increasing number of people interested in the preservation of the Roman baths, &c., that the Corporation of Bath would have acted wisely had they stayed Mr. Davis's hand, and carried out the admirable and relatively inexpensive suggestion made by Prebendary Scarth in the *Bath Chronicle*, May 20th. This, in view of the 60,000, and annually-increasing, visitors to the Roman baths. His proposal was to preserve, "at no great cost, by covering over with a building of sufficient height, after the plan of the present Indian and Colonial Exhibition in London, the remains now exposed; or, the large swimming-bath might be left open to the air, and only the spaces around it arched over, so as to form a promenade where the vestiges of Roman art could be placed. All the Roman remains should be shown *intact*, not in any case built upon, or the present piers used simply as rests for wooden props, so that there might be no confusion of idea. The whole might become an interesting promenade. . . . . I need not suggest how taste and elegance might be displayed, without in any way interfering with, or effacing what remains of, Roman workmanship." He had previously written, "It is essential to the value of these remains that every portion should be exposed so as to be capable of careful study. It would save many a young student a journey to South Italy, or, at any rate, to Rome."—(*Ibid.*) The practical importance of such testimony needs no commendation. It breathes the spirit of the true antiquary.

So far from the alleged recent discovery of the extant remains of Roman Bath by Mr. Davis being true, they were recorded by Guidott, Sutherland, Lucas, and Lysons. Prebendary Scarth has opportunely pointed this out.

FREDERICK A. H. VINON.

A CEMENT QUERY.

SIR,—In reference to the inquiry in your last, I have got rid of the runnings of liquid cement by washing the stained surfaces with hydrochloric acid.

A. E. C.

The Student's Column.

STONE QUARRIES.—XVII.

IRISH GRANITES.

WE will now turn to the granites found in Ireland. We have previously described the outlines of their geographical distribution (p. 109, *ante*), and have said sufficient to enable the student to see that that island is covered by extensive tracts of granite. Although there are large quarries dotted here and there over some of these tracts, yet, it appears to us, that the beautiful material is by no means so extensively raised as it should be. If the granites of Ireland were proportionately worked according to their respective merits, and, as compared with rocks of a similar nature in England or Scotland, there can be no doubt that a gigantic industry would be developed, which would go a long way to alleviate the sufferings and distress of the people in certain districts. It might also have a tendency to keep out the foreign stone which is gradually creeping and finding its way into our markets. If the authorities in the island employed more local stone in the construction of their buildings, and for kerbs, paving, &c., a greater stimulus would be created in opening up new ground. Most of the granite tracts alluded to are not far from the sea, whilst some of them actually form sea-cliffs, and every facility, as far as nature can provide, is afforded for the cheap raising of the stone.

The first large tracts to which we will direct the student's attention are those in the north-east of Ireland. Granite is found here in three distinct areas forming the mountain ranges of Mourne, Carlingford, and Slieve Croob.

According to Professor Hull, the granite of Mourne has hitherto been used only to a very limited extent for building; and, owing to the numerous cavities it contains, and its distinctly crystalline structure, it is probably not as well adapted to architectural purposes as the granite from the Newry district adjoining.

The granite of Newry and Slieve Croob is altogether different in texture and composition from that of Mourne. It is of metamorphic origin, and is much older than that of Mourne and Carlingford. It is a potash granite, consisting of quartz, orthoclase, and black mica. The analysis of this granite from Goragh Wood Station shows an unusually low percentage of silica.

Bessbrook Quarries.—These are situated near the town of that name, not far from Newry, and are principally worked by a limited liability company. There are three large quarries, the stone in the first being of medium-grain, and not unlike that from Dalbeattie; that of the second is much lighter and fine-grained; whilst the granite from the third is of a light blue colour. It is the last-mentioned quarry that produces the stone commonly known as "Bessbrook granite," which is very similar in appearance to the Cairngall stone, near Peterhead.

The principal quarry lies at the base of Camlough, a mountain in the Newry chain. It is a vast excavation, some 700 ft. or 800 ft. long, about 100 ft. broad, and from 80 ft. to 100 ft. deep. The blocks of stone are lifted from the floor of the quarry to the top by a "gantree," which travels over the quarry either across or longitudinally, on a line, the rails of which are laid on blocks of timber, some 80 ft. or 90 ft. apart. Much of the granite is polished, and the works where this branch of the trade is carried on are located apart from the quarries. Splendid specimens of the stone may be seen at the Manchester New Town Hall, where they are up to 21 ft. in length, polished. It has also been extensively employed in buildings, and for kerbs, paving-setts, &c., in London, Manchester, Liverpool, Bristol, Edinburgh, Glasgow, and other large cities. An example of a dock built with it is to be found at Greenock, whilst Newry granite also forms the quays of Bucharest. Other quarries in this part of Ireland are at Castlewellan, Mullaghglass, and Rathfriland, near Banbridge.

The *Belleek* quarries, county Fermanagh, produce stone of a reddish tint, the greater portion of which is used in making porcelain. The rock has a high percentage of orthoclase felspar. Generally speaking, porcelain is made from decomposed granite, but in this case Prof. Hull says that the red felspar retains its crystalline form in its original perfection, and on being calcined loses colour and becomes white. The metallic iron which separates itself from the rock during the process of calcination is afterwards extracted by simply immersing magnets into the powdered china clay when mixed with water; the particles of iron then adhere to the magnets and are lifted out.

The great mass of granite which stretches in a south-south-west direction from Black Rock, near Dublin, to Pollmounty, near New Ross, is generally known as the Wicklow and Wexford mass. It is mostly composed of quartz, orthoclase felspar, and silvery grey mica, but frequently biotite appears, together with the usual accessory minerals. The stone runs in large blocks, and the *Killiney Hill* quarries (Carnsore Point) have supplied a great quantity of granite for the construction of the harbour and pier at Kingstown, the Thames Embankment, and many large buildings in Dublin. Most of the stone is of a grey colour and of good quality, but some care should be exercised in its selection. It is interesting to note that the Killiney granite is in some places distinctly foliated, presenting that metamorphic appearance we have described as occurring in some of the grey and bluish granites of Aberdeen. A representation of this foliated Irish granite is given in the "Explanation" of sheets 102 and 112 of the Irish Geological Survey, p. 33.

The *Blessington* quarries are noted for a bluish grey stone, which works very well, an example of which may be seen in the campanile in the central quadrangle of the Dublin University. The greater part of the large buildings in Dublin are built of granite which comes from *Glencullen* and *Kilgobbin*, in the vicinity, and *Ballyknocken*, co. Wicklow. The stone from the first-mentioned places is of a brownish-grey colour, and is, no doubt, a good serviceable material. The stone from Ballyknocken is greyish-white, and these are said by Professor Hull to be less siliceous and more uniform in texture than that of Killiney. The granite from the *Dalkey* quarries, co. Dublin, is of a grey colour. It is used largely for buildings, kerb, and paving setts, and is hard to work. Examples may be seen in St. Paul's and St. Werburgh's Churches, in the Irish metropolis. Other quarries in this district are at *Bagnalstown*, near Carlow, where the stone is of a dark bluish grey colour; *Glencore*, near Enniskerry; *Lough*, of a whitish-yellow colour, being fine-grained. A good example of the last-mentioned stone may be seen in the new church at Carlow.

The Donegal mass of granite is principally composed of red orthoclase felspar, oligoclase, quartz, black, and occasionally white, mica, and hornblende. Like the Killiney granite, it is roughly foliated, whilst it has also been observed to branch off in veins, on the confines of the mass, which traverse the surrounding metamorphic schist, &c. The Donegal granite does not appear to have been very extensively used. The principal quarries are at *Garvary Wood*, and the stone is very handsome, being composed of large pink felspars,—most likely orthoclase, but oligoclase is present,—clear and transparent quartz, and black mica. The rock found at *Dungloe* is of a reddish colour, but is only used locally.

Mr. R. H. Scott, Sir R. Griffith, and the Rev. Dr. Haughton presented an admirable report to the British Association, which was duly printed in 1863, "On the Constitution of the Granites of Donegal," and the last-mentioned gentleman has written on the same subject in the Jour. Geol. Soc. Lond., vol. xviii., p. 402, *et seq.* We must refer the student to these works for further information.

The granitic rocks of Galway are spread over a large wild tract of country stretching from the town of that name to Roundstone Bay. Two

principal kinds of rock are found, and, according to the observations of the officers of the geological survey, one of these is of metamorphic origin, and the other intrusive.

The largest quarry in the former kind of stone is at *Furbogh*, about eight miles from Galway. It is composed of large red crystals of orthoclase felspar porphyritically developed in a ground mass of orthoclase, light green oligoclase, quartz, and minute flakes of mica. The latter kind of rock is obtained chiefly from *Oughterard* quarry, and is of a light bluish tint, being composed of quartz, orthoclase felspar, and white and black mica. Iron pyrites is also present, but ranks only as an accessory.

Speaking of the Galway granites, Prof. Hull remarks that "little has been done in the way of utilising these rocks, though there can be no doubt that the porphyritic granite is capable of yielding a stone of great beauty, and is well adapted for architectural purposes. A polished pillar of a porphyritic variety of granite may be seen in the Museum of the Royal College of Science, Dublin."

Before concluding our observations on granite, it may be well to mention that a most valuable series of experiments on the crushing weight, and other qualities of various Irish granites has been published by Mr. G. Wilkinson, M.R.I.A., in his work on the "Ancient Architecture and Practical Geology of Ireland," 1845.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

11,771, Dovetailing Machines. J. Knott.

This invention is stated to produce dovetailing exactly as usually performed by hand labour, viz., producing in one piece of wood forming the joint a long "traverse" or opening and a narrow "pin" or locking-piece between the opening, and in the other piece of wood forming the joint a long pin or locking piece and narrow traverse or opening, the two pieces corresponding exactly with each other and forming a perfect joint similar to the ordinary hand-made joint. The chief point of novelty is in the form of the carrier, and a rack and pinion operated by an alternating cam-motion derived from a metallic disc driven by a belt or other suitable means.

13,766, Fireproof Floors. W. H. Lindsay.

The superstructure of the floor is made by passing steel wires through holes drilled in the main girders. The wires are bent and crossed or twisted so as to bind all the wires one to another. The whole of the structure is then embedded in concrete, the concrete being made to extend a distance above and below the parallel girders. In this way a floor is constructed of great strength and has the further advantage that if there should be any cracking of the concrete of the floor, no large portions could drop away as it would always remain upheld by the girders and wires.

4,378, Improved Syphon Cistern. J. Barnes.

The working parts are made of copper, and are therefore non-corrosive. It is very simple in its arrangement, and its great merit is the facility with which any plumber or handy man can repair any part of the said apparatus as there is no cast work in connexion with any of the working parts.

10,441, Removal Stand Pipes for Gas. J. Surl.

The loss of gas by the connecting and disconnecting the taps of street lamps, stand pipes for market lights, smiths' anvils, engine-pit lights, and other gas connectors that are frequently removed, or that may be required for temporary lights is by this invention obviated. A nipple with a hole at the side is fixed so as to be covered by a plug when screwed up or uncovered, when screwed the reverse way a seating of indiarubber passing over the hole and thus cutting off the supply of gas.

10,526, 10,528, and 10,529, Knob Attachments. W. I. Alvord.

These three specifications describe improvements mainly designed to ensure simplicity of construction and a ready attachment to the door. The first relates to an arrangement of the spindle and collar, and the second gives details of construction of the handles and the method of attaching the knob spindles to the hubs; the third specification deals with an alternative form, in which a longitudinal channel is made in the spindles, and the fastening effected by lugs and recesses to fit in the channels so formed.

10,530, Water-closets. Bernard Havanagh (U.S.A.).

This invention consists in an improvement on wash-out closets. A basin is provided having a water-holding concave of an area slightly larger than that of the seat-hole, and with the escape-passage arranged beneath the cover and out of sight. Water is admitted to flush out the concave by force.

NEW APPLICATIONS FOR PATENTS.

Oct. 8.—12,824, J. Pollock, Window Fastenings. —12,832, F. Hilton, Driving Screw Piles.

Oct. 9.—12,874, T. Stanford, Movable Bridge.—12,881, R. Dick, Hand Slotting or Shaping Machine. —12,889, H. Obbard, Chimneys and Chimney Tops or Caps.—12,894, A. Attwood and T. Barber, Self-sustaining lifts, &c. — 12,899, T. Ford, jun., Hydraulic Lifts.

Oct. 11.—12,914, W. Whitehead and A. Emley, Boiler for Heating Buildings, &c.—12,938, J. Mullen, Shooting Planes.

Oct. 12.—12,948, J. Lowe, Automatically Cutting and Preparing the Edge of Wall-paper ready for affixing.—12,950, H. Allison, Lock Hinges. —13,021, H. Dale, Fireproof Shutters for Stairways.

Oct. 13.—13,033, M. Heighley, Syphon Flushing-Cisterns.—13,045, J. Thropp, Carpenters' Braces.—13,056, A. Gray, Window Fastenings.

Oct. 14.—13,088, E. Marsland, Securing Pots to the Tops of Chimneys.—13,103, J. Ritchie, Street Orderly Bin.—13,114, W. Burnett and D. Petrie, Fixing or Suspending Sashes.—13,130, P. Westmacott, Cranes and Hoists.

PROVISIONAL SPECIFICATIONS ACCEPTED.

1,149, H. Hartung, Door-checks.—10,834, C. Groombridge and J. Rickman, Bolts for Doors, &c. —10,954, W. Copping, Stay for Casement and other Windows and Doors.—11,170, J. Watson, Ventilators.—10,484, G. Hudson, Shutter.—10,919, T. Bayliff, Chimney-Tops, Cowls, or Ventilators.—11,079, J. Slack, Furnace Roofs and Bricks for same. —11,542, B. Ludwig, Decoration of Wood, &c.—11,764, C. Jackson, Safety Hoist.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

14,525, J. Gordon, Syphon Drain Traps.—14,695, C. Carson, Electrical Apparatus for Releasing Door-fastenings, &c. — 15,248, O. Elphick, Joints of Stoneware Pipes.—15,255, J. Shanks, Water-closets. —467, W. Withington, Connecting Lead Pipes, &c. —3,903, G. Knight, Step Ladders.—6,756, G. Walker, Construction of Doors.—8,873, E. Grach, Paving and Building Stones, Tiles, &c.—10,631, J. Mobberley and H. Perry, Bricks. — 11,027, J. Sutherland, Construction and Ornamentation of Walls, Ceilings, &c.—15,001, J. Cant, Ventilation. —15,269, G. Couch, Fittings of Doors, Gates, &c.—15,518, W. Robertson, Ornamental Woodwork.—2,850, H. Owen, Chimney or Ventilator Tops.—6,007, T. Harby, Doors for Fireproof Buildings, &c. —6,546, D. Saunders, Hanging Sashes.—8,090, R. Ash, Ventilation.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

October 13.

By S. Walker & Runtz.

Portman-square—15 and 16, Little George-street, 36 years, ground-rent 35*l.*	£800
Rotherhithe, Raymouth-road — A cab and van yard, 65 years, ground-rent 5*l.*	225
Ground-rent of 6*l.* a year, term 65 years	95

By Harman Bros.

Clapton — 199, Evering-road, 89 years, ground-rent 9*l.*	650

By Messrs. Grant.

Commercial-road, E. — 2 to 10 even, Yule court, 80 years, ground-rent 16*l.* 12*s.*	250

By Bean, Burnett, & Co.

Paddington—27, 27A, and 28, Sale-street, and 15, Market-street, 35 years, ground-rent 6*l.*	1,100

October 13.

By Sedgwick, Son, & Whall.

Watford, Stratford-road — The freehold residences, Nutfield and Westfield	4,575
Edmonton — Ground-rents of 49*l.* a year, reversion in 85 years	900

By B. Brown.

Homerton—99, Wick-road, freehold	900
Wick-road—The Eagle beerhouse, freehold	800
Hackney-road — 28 and 30, Maidstone-street, 23 years, ground-rent 6*l.* 12*s.*	105
Burdett-road, E.—Ground-rent of 13*l.* 10*s.*, reversion in 4 years	740
1 to 6, Baythorne-street, 75 years, ground-rent 6*l.* 8*s.*	1,860

By C. & H. White.

Stockwell, Aytoun-road—Ground-rents of 65*l.* 5*s.*, reversion in 62 years	1,590
Ground-rents of 75*l.* 6*s.*, reversion in 59 years	1,835
Herbert-road—Ground-rents of 218*l.* 18*s.* reversion in 65 years	5,720
Sidney-road—Ground-rents of 4*l.* 10*s.*, reversion in 53 years	110
Ground-rents of 62*l.* 8*s.*, reversion in 54 years	1,530
Ground-rents of 61*l.*, reversion in 50 years	1,655
Ground-rents of 15*l.*, reversion in 56 years	365
Stockwell-road—Ground-rents of 75*l.*, reversion in 57 years	1,990

October 14.

By C. C. & T. Moore.

Bethnal-green—135, Cambridge-road, freehold	480

By A. Jackson.

New Barnet—1 to 16, Vernon-terrace, freehold	2,000
Four freehold houses in Victoria-road	465
Brentwood—1 to 11 odd, Deans-road, 94 years, ground-rent 12*l.*	235

By C. & H. White.

Battersea—22 to 28 even, Gladstone-street, 76 years, ground-rent 20*l.*	1,150
Kennington-road—Nos. 61 and 63, freehold	1,790
Nos. 177 to 187 odd, 191 and 193, 81 years, ground-rent 12*l.*	2,155
Nos. 175, 65 years, ground-rent 3*l.*	930
Lambeth—12, 13, 17, 18, and 19, Berkeley-street, and 4, Mill-street, copyhold	1,225
37, 38, and 39, Royal-street, copyhold	500
Vauxhall—11, Spring Garden-walk, freehold	£345
Brixton—Ground-rent of 25*l.*, reversion in 37 years	750
Kennington—Ground-rent of 40*l.*, reversion in 63 years	980
Ground-rent of 35*l.*, reversion in 73 years	800
Ground-rent of 136*l.* 10*s.*, term 72 years	2,505
Ground-rent of 85*l.* 10*s.*, term 72 years	1,530
Ground-rent of 37*l.* 19*s.*, term 82 years	965

By Furber, Price, & Furber.

West Brompton—4 and 6, Drayton-gardens, freehold	1,650
Chelsea—46, King's-road, 57 years, ground-rent 17*l.*	375

By Newbon & Harding.

Kingsland—6 and 7, Nancy-street, 46 years, ground-rent 12*l.*	405
4 to 12, Shacklewell-row, 59 years, ground-rent 32*l.* 10*s.*	1,555
Holloway—Freehold ground-rents of 44*l.* 8*s.*, reversion in 34 years	980
7, Eden-grove, freehold	380
South Hampstead — 7, Fellows-road, 75 years, ground-rent 10*l.*	1,155
Stoke Newington—68 and 70, Cowper-road, 73 years, ground-rent 7*l.*	640
Islington—10 and 11, Prospect-place, freehold	565
Hoxton—265 to 271 odd, Hoxton-street, and 48 to 54, Hemsworth-street, 13 years, ground-rent 12*l.*	1,165

By Wilkinson & Son.

Brighton—19, Pelham-street, freehold	430
74, 77, and 82, St. George's-road, freehold	1,220
5, 6, and 8, West-hill, freehold	1,085
New Shoreham—Freehold cottage in Middle-street	65

MEETINGS.

Monday, October 25.

Society of Arts.—Canon Isaac Taylor on "Domesday Book." 8 p.m.

Auctioneers' Benevolent Fund.—Annual Meeting of Donors and Subscribers (Estate Exchange, Auction Mart, 3.30 p.m.).

Royal Academy. — Professor John Marshall on "Anatomy." VII. 8 p.m.

Tuesday, October 26.

Society of Antiquaries of Scotland.—Rhind Lectures in Archæology. III. By Professor David Masson. (Masonic Hall, Edinburgh, 8 p.m.).

Wednesday, October 27.

Royal Academy. — Professor John Marshall, on "Anatomy." VIII. 8 p.m.

Friday, October 29.

Society of Antiquaries of Scotland.—Rhind Lectures in Archæology. IV. By Professor David Masson. 8 p.m.

Royal Academy. — Professor John Marshall on "Anatomy." IX. 8 p.m.

Miscellanea.

Large Sale of Houses and Ground-rents in South London.—Last week Messrs. C. & H. White, at the Auction Mart, conducted a two days' sale of freehold and leasehold houses and ground-rents, situated in Lambeth, Kennington, Brixton, and Stockwell. The sale took place by direction of the executors of the late Mr. Robert Parris, and comprised eleven houses in Kennington-road, producing an annual rental of 620*l.* a year; ten copyhold houses in Berkeley-street and Miles-street, Lambeth, producing a rental of 258*l.* per annum; together with freehold and leasehold ground-rents amounting to 944*l.* per annum, secured on 160 houses and shops, with reversion to the rack-rents, estimated at 5,900*l.* per annum. The property was submitted in eighty-two lots. The first day's sale consisted of fifty-three lots, comprising the ground-rents on houses in Aytoun-road, Herbert-road, and Sidney-road, Stockwell, amounting to 584*l.* per annum. They were sold for an aggregate sum of 14,845*l.*, representing about 4 per cent. on the purchase money. The second day's sale contained twenty-nine lots, and included the freehold and leasehold houses in Kennington-road and Lambeth, together with the ground-rents, amounting to 359*l.* per annum, secured upon houses in the same localities. The freehold houses in Kennington-road and the adjoining districts were sold at prices representing from six to seven per cent. upon the purchase money; whilst the leasehold property, held for unexpired terms varying from sixty-five to eighty-one years, realised sums amounting to about ten per cent. on the outlay after payment of ground-rents. The ground-rents sold during the day produced 7,215*l.*, or about five per cent. on the purchase money. The proceeds of the day's sale was 14,630*l.* and the aggregate sum produced by the two days' sale amounted to 29,475*l.*

Cremation in Denmark. — The first crematory in Denmark has just been completed on the Pheasant-road, near Copenhagen. It is a building in Italian style, designed and erected by the well-known Italian architect and engineer, Venini. A large plot of land belonging to the owners of the crematory, and adjoining it will, when the necessary funds have been obtained, be laid out as gardens with a columbarium for the deposits of the urns containing the remains of the cremated in tastefully designed niches with inscriptions. The first body of a Dane was cremated here a week ago.

A Private Lunatic Asylum at Formby, near Liverpool, called Shaftesbury House, was opened last week. The new building is the property of Dr. Stanley A. Gill, M.D., who has at a great outlay had the asylum erected on plans approved by the Commissioners in Lunacy. The buildings, which are designed as a private asylum for the treatment of those mentally afflicted, comprise two distinct wings, one being for ladies and the other for gentlemen. The apartments are large, cheerful, and airy, having chiefly a southern aspect, and are so arranged that patients can have their own suites of rooms if required. Special means have been adopted for warming and ventilation, and the drainage has been carried out according to the requirements of the Local Government Board, while the water is being supplied from the Southport Waterworks. Fire escapes have also been provided for. The buildings are enclosed in nine acres of land, which are being tastefully laid out into airing grounds, bowling-green, lawn tennis courts, and ornamental gardens. The buildings are erected to accommodate forty patients. The central feature under the tower is the reception-hall, 28 ft. by 25 ft., having a handsome pitch-pine staircase and ornamental pitch-pine block flooring. From this is approached the doctor's residence, the consulting-room, the visitors' room, and the corridor, on the right and left of which are the ladies' and gentlemen's apartments respectively. The large entertainment-room, the chapel, and the approaches to the grounds are between the two wings, being separated by vestibule doors. Each wing comprises two storeys, identical in design, and the arrangements corresponding on each floor as regards day-rooms, drawing-rooms, bedrooms, bath-rooms, lavatories, &c.; and there are two stone staircases to each wing. A padded-room, admirably fitted up, is provided for violent cases on the ground floor in each wing. The heating and ventilating arrangements have been under the care of Mr. Blake, of Messrs. Haden & Sons, of Manchester. The exterior work is of grey brick, with patent red brick and terra-cotta dressings; the roofs have bands of green slates interspersed with the blue, and to the east of the building a large conservatory is provided. The sole contractor for the pile of buildings is Mr. Joseph Sawyer, of Waterloo, and the whole has been built to the designs and under the superintendence of Mr. William Parslow, F.R.I.B.A., whose representative, Mr. Robert Williams, has been in constant attendance as clerk of the works.

The Large Chimney at Manningham Mills, Bradford, has just been undergoing repairs, and has had two new lightning conductors fixed upon it. The chimney, according to the clerk of the works, is widely known as "Lister's Pride," and is one of the largest stone chimneys in the country; in fact, it stands unrivalled as to the size of flue from bottom to top, the flue being 14 ft. across in every part. The outside dimensions of the chimney are 21 ft. across, and it is about ninety yards in height. The highest thirty yards form a very elaborate piece of stonework. The first outside projection is 4 ft., the panelling and the window-sills, with heads, which are circular, and all the other work between this and the top cap, have required all the ability and skill that Mr. Ball possessed to point so many difficult and dangerous places. The lightning conductors are two of the largest that have ever been fixed upon any chimney in Great Britain. They are of solid copper tape, 2 in. by ¼ in., and have two elevation rods some 14 ft. long, made of 1¼ in. copper bar, the same being non-insulated. Mr. Joseph Ball, York Castle, Oldham, who has completed the work throughout, has also pointed the chimney about thirty yards down from the top, which gives the structure a fine appearance, and has removed the jagged, weather-beaten look which it formerly had. The chimney is said to have cost from 10,000*l.* to 11,000*l.* when it was built.

Mountain Ranges.—Messrs. Taylor & Francis will shortly publish a work by Mr. T. Mellard Reade, F.G.S., entitled "The Origin of Mountain Ranges." In addition to containing a systematic theory of mountain-building, with detailed experimental illustrations, the structure and geological history of the great mountain-masses of the globe will be discussed. The work will also contain many maps and sections of mountain ranges and a contoured map of the North Atlantic Ocean, together with numerous sketches of mountain structure and scenery, from nature, by the author.

The Auctioneers' Benevolent Fund.—The annual meeting of the donors and subscribers of this Institution will be held at the Estate Exchange, Auction Mart, Tokenhouse-yard, on Monday next. In their annual report for the year ending June 30th, 1886, the Committee state that the subscriptions amounted to the sum of 222*l.* 12*s.*, and the donations to 87*l.* 16*s.*, for the year ending June 24th last, being an increase over the preceding year of 20*l.* and 23*l.* 4*s.* respectively, exclusive of the legacy of 200*l.* received from the executors of the late Mr. George Trist. During the year several cases have been relieved, and the sum of 350*l.* has been invested in consols in the names of the trustees, and in order to increase the income and thus enable the Society to grant another annuity, a further sum has been sold from Consols and invested in Queensland Four per Cent. Inscribed Stock, the investments now being, Consols, 624*l.* 11*s.* 2*d.* Stock; Queensland Four per Cent. Inscribed, 2,976*l.* 8*s.* 6*d.* Stock. The members of the committee retiring by rotation are,—Messrs. Baker, Elgood, Mann, Murrell, Savill, and Storr, all of whom are eligible for re-election.

The Evictions at Chelsea.—The demolition of dilapidated property is as much demanded at Chelsea as elsewhere, and although some portions may be sufficiently good to stand for some time longer, the small minority, however sound, cannot be allowed to stand in the way of the general improvement required by the majority; hence a few homely cottages, clad with ivy and creepers, must perforce be pulled down to make way for widened streets and proper access to main thoroughfares. The contemplated plans deal with two large areas, the first comprising the district between Sloane-square, Pimlico-road, and Lower Sloane-street,—this property containing a mixed population with an average number of the working-class, possibly some 700 or 800, and for whom accommodation will be provided in special dwellings on a piece of land to be reserved, containing 39,000 feet superficial, which is estimated to be sufficient for present wants. The second scheme principally affects Leete-street, on the north of the King's-road, the dwelling-houses being small and the tenants of a grade higher than those just mentioned.—*Sanitary Record.*

Sale of Building Sites near Woking.—On Friday in last week, Messrs. Debenham, Tewson, & Co., offered for sale, by direction of the National Liberal Land Company, a number of freehold building sites, being a portion of the Horsell Grange Estate, situated within a mile of the Woking station of the London and South-Western Railway. The estate is nearly 1,000 acres in extent. The sites submitted were fifteen in number, varying in size from about one to four acres, each site having frontages of from 160 ft. to 220 ft., and depths of 400 ft. and 500 ft. The stipulations provided that no house to be erected on the estate should cost less than 605*l.* The sale took place in a barn adjoining Castle House, which forms a portion of the estate. Of the fifteen lots offered, seven were sold for the aggregate sum of 2,260*l.*, being at the rate of about 300*l.* an acre.

Asphalte and Wood-Paving in Berlin. There are at present in Berlin 365,000 square mètres of streets paved with the so-called *asphalt comprimé*, of which 30,000 mètres have to be re-laid yearly. Lately some experiments have been made with German asphalte, but it is as yet too early to pronounce upon its qualities. At present asphalte is only obtained from three places in Europe, viz., Ragusa, in Dalmatia, and Val de Travers and Seyssel, in the department of Aisne, in France. In Berlin asphalte has entirely superseded wood for street paving, the latter being now only used between the metals on the tramways. The wood-paved streets in Berlin only cover 44,000 square mètres.

Domesday Commemoration.—Canon Isaac Taylor will deliver a popular lecture in the great hall of the Society of Arts on Monday evening next, the 25th inst., at eight p.m. Tickets may be had gratis on application to the honorary secretary, Mr. P. Edward Dove, Barrister-at-law, 23, Old Buildings, Lincoln's Inn. The Commemoration will commence at three p.m. on the same day, with a visit to the Public Record Office, where Domesday Book and other interesting MSS. will be exhibited. This exhibition will be open only to subscribers to the Commemoration.

Richmond Drainage Scheme.—The detailed plans and sections of the Richmond Drainage Scheme having now been completed by Mr. Melliss, C.E., and several alterations having suggested themselves as desirable, the vestry of that town has resolved to increase the sum to be borrowed, and for sanction to which application is to be made to the Local Government Board, from 96,000*l.* to 100,000*l.* It has now been decided to lay the sewer through Barnes 2 ft. lower than was originally intended, so as to embrace within the scheme the drainage of many houses there at the lowest levels. And to correspond with this alteration the Petersham end of the sewer will be lowered 1 ft. 6 in. or 8 in. This will involve an additional outlay of 1,200*l.* Then, in order to avoid any possible risk of the site of the proposed pumping station at Mortlake being flooded during storm or high tides, it is proposed to raise it 6 ft. higher than the level shown in the original plan. Provision has now been made for the erection of a wharf at the side of the river near the works. And, as already reported in the *Builder*, the Vestry have, since the date of the first application for loan to the Local Government, made arrangements for the purchase of certain plots of land adjoining the proposed pumping-station, which plots belong to the Duke of Devonshire, the Pullman Trustees, and Mr. Popham. By this arrangement the Vestry hope to diminish materially the cost and strength of the opposition, as certain of these plots were acquired by their present owners to secure them a *locus standi* in opposing the scheme. Complaint was made by one or two of the Vestrymen that the proper levels for the sewers had not been ascertained at the beginning; but Mr. Burt read a letter from the engineer, in which the latter stated, "I am perfectly satisfied that the depth is sufficient; but in order that there may be no controversy, let us put it 2 ft. deeper." It is expected that the Local Government Board will hold shortly a public inquiry in connexion with the application for the loan.

Cable Tramways, Birmingham.—The *Daily Mail* says that the Tramways Sub-Committee of the Public Works Committee were lately placed in a difficult position with reference to the giving out of some of the contracts for the cable tramway, from the fact that steel rails of German manufacture were offered at an appreciably lower price than English. The difference in price upon about 1,000 tons of rails required amounted to about 500*l.*, and the tramway company, who are the contractors, urged that they had a right to purchase in the most favourable market. The Public Works Committee, on the other hand, were desirous of using materials of home production. The company, appreciating the position taken by the committee, have been able to arrange terms whereby the rails of the Barrow Hematite Steel Company shall be employed. The contract, which has been placed with the Barrow Company, represents the first of the three sections into which the tenders were divided, and comprises the ordinary girder section rails, the slot rails, and the necessary fish-plates. The schedule of prices sent in by Messrs. Tangye Brothers, Soho, has been accepted for the supply of the ironwork required in the construction of the tramways from Colmore-row to the borough boundary at Hockley, comprising over 250 tons of tee-iron yokes for cable tube, wrought-iron tie-bars, bolts and nuts, washers, angle and tee iron, rolled iron girders, malleable iron pulleys and frames, inspection hatches and frames, side entrance doors and frames, crucible steel points for tramway and slot rails, crossings, &c. The contract for laying the lines between Colmore-row and Hockley has been secured by Mr. Jacob Biggs, of Handsworth. Arrangements are being made for the work to be commenced forthwith.

The Timber of British Columbia.—An idea of the value of British Columbia's forest wealth may be gathered from the fact that four logs recently cut near Vancouver contained 20,580 ft. The logs were as follows:—One log, 62 ft. long, 40 in. in diameter, 5,299 ft.; one log, 53 ft. long, 44 in. in diameter, 5,600 ft.; one log, 36 ft. long, 54 in. in diameter, 5,625 ft.; one log, 24 ft. long, 56 in. in diameter, 4,056 ft. The Douglas pine has long been celebrated for its great size, but it has hitherto been, except where found near the water's edge, comparatively valueless. Now that the railway can carry it to the sea it will become an important export. —*Liverpool Journal of Commerce.*

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	10	0	7	0	0
Teak, E.I. ....load	9	0	0	14	0	0
Sequois, U.S. ....foot cube	0	2	4	0	2	7
Ash, Canada ....load	3	0	0	4	10	0
Birch ,, ...	2	5	0	3	10	0
Elm ,, ...	3	10	0	4	10	0
Fir, Dantsic, &c.	1	10	0	4	0	0
Oak ,, ...	3	10	0	4	10	0
Canada	3	0	0	6	0	0
Pine, Canada red	2	0	0	3	10	0
,, yellow	2	5	0	4	0	0
Lath, Dantsic ....fathom	3	0	0	5	0	0
St. Petersburg	4	0	0	5	10	0
Wainscot, Riga ....log	2	15	0	4	0	0
,, Odessa, crown....	3	5	0	3	7	6
Deals, Finland, 2nd and 1st...std.100	7	0	0	8	0	0
,, 4th and 3rd	6	0	0	6	10	0
Riga	5	10	0	7	0	0
St. Petersburg, 1st yellow	8	10	0	14	0	0
,, 2nd ,, ...	7	0	0	8	0	0
,, white	7	0	0	10	0	0
Swedish	6	0	0	15	0	0
White Sea	7	0	0	17	10	0
Canada, Pine, 1st	17	0	0	29	0	0
,, ,, 2nd....	11	0	0	17	0	0
,, ,, 3rd, &c.	6	0	0	8	0	0
,, Spruce, 1st	8	0	0	11	0	0
,, ,, 3rd and 2nd	5	0	0	7	10	0
New Brunswick, &c....	5	0	0	7	0	0
Battens, all kinds	4	0	0	12	0	0
Flooring Boards, sq. 1 in., Prepared, first	0	9	0	0	13	0
Second	0	7	6	0	8	6
Other qualities	0	5	0	0	7	0
Cedar, Cuba ....foot	0	0	3	0	0	3½
Honduras, &c.	0	0	2½	0	0	3½
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	4	0	0	7
St. Domingo, cargo average	0	0	4	0	0	7
Mexican ,, ...	0	0	3½	0	0	4½
Tobasco ,, ...	0	0	4	0	0	6½
Honduras ,, ...	0	0	4	0	0	6½
Maple, Bird's-eye	0	0	6	0	0	8
Rose, Rio ....ton	7	0	0	10	0	0
Bahia....	6	0	0	10	0	0
Box, Turkey	5	0	0	17	0	0
Satin, St. Domingo ....foot	0	0	6	0	0	10
Porto Rico	0	0	7	0	1	0
Walnut, Italian	0	0	4	0	0	5

METALS.	£.	s.	d.	£.	s.	d.
Iron—Pig, in Scotland ....ton	0	0	0	0	0	0
Bar, Welsh, in London	4	7	6	4	15	0
,, ,, in Wales	4	2	6	4	7	6
,, Staffordshire, London	5	10	0	6	0	0
Sheets, single, in London	6	15	0	8	10	0
Hoops ,, ...	6	0	0	7	0	0
Nail-rods ,, ...	5	10	0	6	10	0
Copper—						
British, cake and ingot ....ton	44	0	0	45	0	0
Best selected	45	10	0	46	0	0
Sheets, strong....	52	0	0	0	0	0
,, India	0	0	0	0	0	0
Australian	0	9	0	0	0	0
Chili, bars	41	0	0	41	7	6
Yellow Metal ....lb.	0	0	0	0	0	0
Lead—						
Pig, Spanish ....ton	12	10	0	0	0	0
English, common brands....	12	17	6	0	0	0
Sheet, English	13	12	6	13	15	0
Spelter—						
Silesian, special ....ton	14	5	0	0	0	0
Ordinary brands....	14	0	0	14	2	6
Tin—						
Banca ....ton	0	0	0	0	0	0
Billiton	0	0	0	0	0	0
Straits	100	0	0	0	0	0
Australian	100	0	0	0	0	0
English ingots	104	10	0	0	0	0
Zinc—						
English sheet ....ton	18	0	0	18	5	0

OILS.						
Linseed ....ton	20	5	0	20	10	0
Cocoanut, Cochin	34	10	0	35	0	0
Ceylon	26	0	0	0	0	0
Copra	0	0	0	0	0	0
Palm, Lagos	23	10	0	0	0	0
Palm-nut Kernel	0	0	0	0	0	0
Rapeseed, English pale	22	5	0	22	10	0
,, brown	20	15	0	21	0	0
Cottonseed, refined	18	0	0	19	0	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	6	0	0	10	0	0
,, refined	8	0	0	13	0	0
Turpentine—						
American, in casks ....cwt.	1	8	6	0	0	0
Tar—						
Stockholm ....barrel	0	15	0	0	15	6
Archangel	0	10	6	0	11	0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Boys' School and Offices, Hartlepool	Govs. Henry Smith Schl	25*l.*, &c.	Nov. 20th	i.
Enlarging Infirmary....	Greenwich Union	45 guineas	Not stated	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Making-up Roads	Wandsworth Bd. of Wks	*Official*	October 26th	xiii.
Completion of Twelve Houses	....	T. F. Shaw....	do.	i.
Works and Materials (Sewers)	St. Martin-in-the-fields Vestry	*Official*	October 28th	ii.
Road Formation and Construction	East Barnet Valley L. B.	do.	October 30th	ii.
Hand Broken Guernsey Granite	Finchley Local Board	G. W. Brumell....	Nov. 1st	ii.
Clearing-out Lake, &c., Finsbury Park....	Met. Board of Works	*Official*	Nov. 2nd	i.
Asphaling, Kerbing, &c.	Lewisham Brd. of Wks.	do.	do.	ii.
Sewering Road	Chiswick Local Board	A. Ramsden	Nov. 3rd	ii.
Broken Granite	Borough of Dover	*Official*	Nov. 8th	xiii.
Stoneware and Iron Pipe Sewers, &c....	Cromer Local Board ...	J. C. Melliss....	do.	ii.
Construction of small Landing Pier....	Rochester Corporation	*Official*	do.	ii.
Sewerage Works	Sevenoaks R.S.A.	J. G. Hall, C.E.	Nov. 9th	ii.
Two Class-Rooms	Walthamstow Schl. Bd.	W. A. Longmore....	do.	ii.
School for Boys	do.	do.	do.	ii.
Painting, &c., Works, Darenth....	Met. Asylums Board ...	A. & C. Harston	Nov. 15th	xiii.
Repairing, &c., Venetian Blinds, Darenth....	do.	do.	do.	xiii.
Pumping Machinery....	Tottenham Local Board	— De Pape	Nov. 16th	ii.
Engine-House, &c.	do.	do.	do.	ii.
Galvanised Iron Dust-bins	School Brd for London	*Official*....	Not stated...	ii.
Removal and Erection of Two Iron Buildings	do.	do.	do.	ii.
Making Two Playgrounds	do.	do.	do.	ii.
Tar-Paving Playgrounds	do.	do.	do.	ii.
Restaurant and Boathouse, East Moulsey	....	Burnell-Burnell	do.	xiii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Inspector of Nuisances	Plumstead Bd. of Wks.	65*l.* and residence ...	October 30th	xvi.

TENDERS.

BIRMINGHAM.—For the whole of the works required in the construction and completion of a double line of cable tramways between Snow-hill Terminus and the borough boundary, including the removal of existing lines, and repairing roadway with granite setts, for the Birmingham Central Tramways Company, Limited. Mr. E. Fritchard, M.Inst. C.E. and Mr. J. Kincaid, M.Inst. C.E., engineers :—

Jacob Biggs, Handsworth, Birmingham, accepted.
(Schedule of prices.)
[Note.—Rails, ironwork, and paving setts provided.]

BRIXTON.—For erecting new premises at Loughborough Junction, for Messrs. Osborne & Young, cornfactors. Mr. Cruwys, architect. No quantities :—

W. Rowe....	£6,160	0	0
F. Higgs....	5,680	0	0
Cander	5,500	0	0
Dickinson	5,500	0	0
Kynoch & Co.	5,335	0	0
Mason	5,193	0	0
Holliday & Greenwood	4,949	0	0
Rodwell	4,500	0	0

BATTERSEA.—For the construction of concrete river wall, dumb dock, flushing-chamber, &c., at Lombard-road Wharf, Battersea, for the Board of Works for the Wandsworth District :—

Howard	£2,173	0	0!
Marshall	1,580	0	0
G. Neal	1,494	0	0
Batchellor	1,460	0	0
King	1,450	0	0
Richens & Mount	1,449	0	0
H. R. Trehearne & Co.	1,440	0	0
B. Cooke & Co....	1,380	0	0
Torkington....	1,160	0	0
Dickenson	1,100	0	0
Cunliffe	870	0	0!

[Surveyor's estimate, 1,450*l.*]

CHATHAM.—For building the Bible Christian Chapel, Trafalgar-road, New Brompton, Chatham. Messrs. Margetts & Son, architects, Chatham :—

Nye Brothers, Rochester	£2,167	0	0
Naylar & Son, Rochester	2,090	0	0
Alloway, Chatham	2,050	10	0
Skinner, Chatham (accepted)	1,985	0	0

[Architect's estimate, 2,177*l.*]

CHISWICK.—For laying 12-in. sewer, with manholes, &c., complete, in the Duke's-avenue, Chiswick, for the Imperial Property Investment Company, Limited, Moorgate-street. Mr. G. H. L. Stephenson, surveyor :—

G. Bell	£792	0	0
Cook & Co.	750	0	0
Pizzey	737	0	0
Adams	693	0	0
Walker	583	0	0
Wilson (accepted)	555	0	0

CLAPHAM.—For alterations and additions to No. 1, The Chase, Clapham, for Mr. T. R. Pace :—

Kynoch & Co.	£170	0	0

HAMMERSMITH.—For the erection of a new branch bank, for the Directors of the London and South-Western Bank, Limited, at No. 8, The Broadway, Hammersmith. Messrs. Thos. & Wm. Stone, architects, Great Winchester-street. Quantities by Mr. G. A. P. Cuxson, Westminster Chambers :—

N. Lidstone....	£3,960	0	0
J. T. Chappell	3,940	0	0
J. Smith & Son....	3,896	0	0
H. Smith & Son	3,895	0	0
Adamson & Son....	3,890	0	0
B. E. Nightingale	3,670	0	0
C. Kynoch	3,648	0	0
W. Gregar (accepted)....	3,629	0	0
H. Johnson	3,537	0	0

IPSWICH. — For gardener's cottage, Henley-road, Ipswich. Mr. Frank Brown, architect, Thoroughfare, Ipswich :—

R. Girling	£243	0	0
T. Turner	225	0	0
F. Bennett....	222	10	0
W. Grayston (accepted)....	197	10	0

KENNINGTON.—For proposed warehouse, stabling, &c., at rear of No. 10, South-place, Kennington, for Mr. Sydney Jousiffe. Mr. Edward Clark, architect, Strand. Quantities by architect :—

J. Beale	£1,017	0	0
T. L. Green	991	0	0
J. Anley	990	0	0
Wilkinson Bros.	985	0	0
J. O. Richardson	929	0	0
W. Smith	919	0	0

LEAMINGTON.—For the extension and renovation of the Pump-room baths :—

Building Work.

T. H. Jones	£779	0	0
T. Bailey....	715	0	0
G. F. Smith	695	0	
W. Jenkins (accepted)	607	10	3

Engineering Work.

J. & F. May	1,357	0	0
J. Smeaton, Son, & Co.	1,298	16	6
A. Adams	1,083	0	0
W. Jenkins (accepted)	948	12	10

LONDON. — For the erection and completion of the London Central Fish Market, for the Honourable the Corporation of the City of London. Sir Horace Jones, architect. Quantities by Messrs. William Reddall & Son :—

Cooke & Co.	£32,634	0	0
Webster	29,900	0	0
Boyce....	28,990	0	0
Nixon....	28,790	0	0
Bywaters	28,620	0	0
Hall, Beddall, & Co.	28,330	0	0
Holliday & Greenwood....	28,300	0	0
Conder	28,160	0	0
Morter	28,000	0	0
Colls & Sons....	27,980	0	0
Perry & Co.	27,868	0	0
Holland & Hannen....	26,933	0	0
Chappell & Co.	26,822	0	0
Mowlem & Co....	26,698	0	0
Hart	26,210	0	0
Nightingale	25,946	0	0
Killby & Gayford	25,830	0	0
Gentry	24,875	0	0

LONDON.—For alterations, &c., at the Lord Clyde tavern, Commercial-road East, for Mr. T. W. Venner. Mr. H. E. Mountford, surveyor, Pigott-street :—

Palmer & Sons	£575	0	0
Lusk....	540	0	0
Nicholls	504	0	0
Walker, Limehouse....	494	0	0

LONDON. — For alterations, &c., of Copenhagen Tavern, Salmon's-lane, Limehouse, for Mr. M. J. Wesson. Mr. H. E. Mountford, surveyor, Pigott-street, Limehouse :—

Nicholls, Leytonstone	£460	0	0
Walker, Limehouse (accepted)	434	0	0

LONDON.—For pewterer's work at the Mitre Tavern, Chancery-lane, for Mr. Drew. Mr. H. I. Newton, architect, Queen Anne's-gate, Westminster :—

Helling	£137	10	0
Sanders & Sons	136	0	0
T. Heath (accepted)	105	0	0

LONDON.—For alterations and repairs to the Horse and Dolphin, Macclesfield-street, Soho, for Mr. W. H. Cooper. Mr. Edward Clark, architect, Strand :—

T. L. Green	£883	0	0
Munday & Son....	835	0	0
Jackson & Todd	792	0	0
J. Anley	736	0	0
J. Hocking (accepted)	699	6	0
Stayner & Son	667	0	0

RAMSGATE.—For the erection of six dwelling-houses at Southwood, Ramsgate, for Mr. C. Buckley. Mr. E. L. Elgar, architect and surveyor, Ramsgate :—

Pilcher & Co., Fordwich	£1,830	0	0
G. M. Dawson, Broadstairs	1,144	17	0
H. Miller, Ramsgate	1,060	0	0
T. Elgar, Ramsgate....	960	0	0
C. Collins, Ramsgate	950	0	0
J. Newly, Ramsgate	936	0	0
J. Olive, St. Peter's	888	0	0
Newly Bros., Ramsgate....	858	0	0
Bowman, Ramsgate....	840	0	
W. W. Martin, Ramsgate	780	0	